Flying-fox Heat Event Response Guidelines SEQ

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1.0 INTRODUCTION

Flying-fox populations are increasingly threatened by heat events, starvation events and other stressors due to habitat clearing and human/flying-fox conflict. These factors are unlikely to resolve, meaning that a well-coordinated and timely approach to flying-fox disasters is imperative for the mitigation of further flying-fox population impacts.

The following document aims to give a framework for all stakeholders for the prevention, preparedness, response and recovery of flying-foxes during such events.

Imperative to the use of this document in areas outside of South East Queensland is the need to analyse individual roosts for appropriateness of heat response type. As can be shown in **Appendix 14.0** of this document, some roosts were identified by forum attendees with knowledge of specific roosts were identified as not suitable for any heat response intervention due to a variety of factors. It is likely that roosts in other areas of Australia will have similar constraints that need to be identified.

Stakeholders who may find this document useful would include, but are not limited to:

- Land Managers
- Decision makers
- Researchers
- Conservationists
- Veterinarians
- Wildlife professionals
- Wildlife carers

The following document was created after a flying-fox heat response forum was sponsored by LGAQ and hosted by Logan City Council, convened by Mrs Lee-Anne Veage. Environment Officers, Wildlife Officers and key wildlife carers experienced in flying-fox heat event responses representing each of the key regions in the greater SEQ region were in attendance of a full day conference and workshop. The data from the questionnaire found in **Appendix 14.6** was collated and utilised to form the following document.

The document was written by Dr. Tania Bishop BVSc(*hons1a*) MANZCVS (*Avian Health*) and co-authored by Mrs. Rachel Lyons BRTP(Hons), GC Env. Man.

The document has been reviewed by the following people due to their key expertise in the field:

- Dr. Peggy Eby
- Dr. Alison Peel
- Mr David Zammit
- Mrs Lee-Anne Veage
- Mr Tim Pearson

Attendees at the forum contributing to data:

Rodney Adam – Environment Officer - Logan City council
Lee-Anne Veage – Environment Officer – Logan City Council
Tim Shields – Environment Officer – Ipswich City Council
Darren McPherson – Environment Officer – Somerset Council
Jenny Davis – Wildlife Officer – Redland City Council
Lisa Bailey – Wildlife Officer – Redland City council
Raeleen Draper – Wildlife Officer – Sunshine Coast council

Glenn Miechel – Wildlife Officer – Sunshine Coast Council
Andrew Evans – Environment Officer – Moreton Bay Regional Council
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Bill Shead
Charmaine Brayley
Jade Lewis
Sammy Ringer
Byron Cann
Lorna Smith
Dee Smith
Linda Darcy
Mary Jane Robinson
David Zammit
Sharon Quinlan
Trish Wimberley
Cathy Griffin
Sylvia Hood
Carmel Givens
Paula Frazer
Michelle Morgan
Leanne Robinson
Valerie Holbeck
Kerry Kent
Nitin Pandya
Ashley Fraser

2.0 IDENTIFICATION OF HEAT STRESS EVENT (HSE) SITES

Heat stress variables that determine the susceptibility of a roost during a heat stress event (HSE) include the following:

Weather/Climate
Temperature >40°C & No. of consecutive days
Humidity
Wind direction – West and North
Camp attributes
Size of camp and history of prior heat events
Camp composition – understory, mid-storey and canopy – open / closed structure – incredibly important
Proximity to water
Topography / aspect / altitude
Location – westerly aspects, heat islands
Crowding at camps
Camp Capacity
Human Activity and site tenure – incidental or intentional disturbance
Other stressors for camp e.g. camp management, food shortages
Splintering of camps
Demographics
Time of year – mating; pregnant lactating female, pregnant females
Number, age and developmental stage of juveniles
Species composition

During the HSE Forum held in Logan on 3rd November 2017, a list of all prior HSE sites in SEQ was developed with information collected pertaining to Camp attributes, sensitivity, monitoring efforts and relevant contacts. This list was collated and is contained in **Appendix 14.1**.

3.0 FLYING-FOX BEHAVIOUR MONITORING

Figure 1 Normal behaviour

Flying-fox monitoring is critically important before, during and after a response.

NORMAL BEHAVIOUR (CLASSIFIED AS CATEGORY 1)

A greater understanding of " normal" behaviour (Classified as Category 1) will aid in an understanding of abnormal behaviour so to indicate if a response is going to be required.

The time of year, ambient temperature and relative humidity should always be considered as an essential part of information when interpreting any behaviour.

The percentage (%) and demographics of animals carrying out such behaviours are also important. i.e.; pregnant/lactating females fanning only versus the entire colony fanning. Pregnant and lactating females can start fanning at temperatures as low as 23 °C due to the higher metabolic demands of their physiological state.
Whilst observing these behaviours is important and can act as early warning systems of arising issues, it is also important to note that these behaviours can be normal in these animals.
Behavioural progression from animals showing signs of heat stress through to heat stroke will always follow a predictable consistent progression. (Snoyman et al., 2012). This progression is as follows:

WING FANNING (CLASSIFIED AS CATEGORY 2)

- Wing Fanning is normal cooling behaviour in minor heat stress.
- It is conducted to increase the flow of cooler air over the wing membranes where the dilated blood vessels full of warmed blood can cool from radiant cooling.
- This can start at temperatures as low as 23°C-30°C depending on the physiological status of the individuals within the camp and the relative humidity.
- Monitoring only the numbers of bats carrying out this behaviour and any progression needs to be noted at this point.

Figure 2 Wing fanning

CLUSTERING (CATEGORY 3a)

- Bats start to move further down the trees into the middle-storey vegetation. Thermal imaging has revealed that bats are attempting to move to cooler microclimates within the camp. (Welbergen et al. 2012)
- Bats will continue to fan during this time and if temperatures continue to rise they will start panting and wrist licking.
- Whilst this stage does not immediately trigger an alert, bats starting to carry out this behaviour need to be monitored and response groups need to be placed on alert for the possible need of an on-site response.
- This behavioural stage should be posted on alert platforms and once confirmed, preparations for response should be coordinated.

Figure 3 Clustering

It is important to note that bats at this stage should never be disturbed. Disturbance is likely to risk bats becoming stressed and taking flight, causing serious heat stroke and possible death.

CLUMPING (CATEGORY 3b)

- Flying-foxes at this stage will roost on top of each other.
- This can occur on:
  - Shaded side of the trees
  - Under logs
  - The understorey
  - In tree hollows
  - The base of trees
  - On the ground
- These clumps can consist of in excess of 50+ flying-foxes.
- At this stage flying-foxes should not yet be approached for spraying, as many would not tolerate spraying at this point.
- At this time HSE response personnel should be in place and set-up for a response, should the sensitivity of the roost, location and resources allow.

Figure 4 Clumping

PANTING/WRIST LICKING AT THE BOTTOM OF TREES (CATEGORY 4)

- At this stage a response should have been triggered and a response site should already be set up ready to go, if intervention is suitable for the roost and site.
- Bats start to pant and lick their wrists. Ambient temperature has continued to rise and clumping in cooler microclimates and wing fanning has failed to lower their core body temperatures.
- Wrist licking and panting is utilised as a means of using evaporative cooling to lower core body temperatures.
- In high humidity heat events, this is hampered by high humidity affecting the ability of bodily fluids to evaporate and cool the body.
- In low humidity heat events, this will be very effective at cooling the body, however it will be extremely costly as flying-foxes will dehydrate very quickly.

Figure 5 Wrist Licking

- This is why HIGH and LOW humidity events require a different approach to spraying timing and monitoring.
- Bats will become very dehydrated and become hypoglycaemic and vague due to the effort of fanning and heat stroke starting to affect body functioning.
- Bats will move to the bottom of the trees and those with no mid-storey may fall from the upper canopy with severe heat stroke.
- At this stage, monitoring needs to be undertaken very carefully.
- Rescuers need to very cautiously approach bats at the base of trees to monitor for any signs of distress and bats trying to lift off.
- Rescuers then MUST move away as quietly as possible to avoid bats lifting at this critical stage.
- Any seizuring animals should be taken for euthanasia ONLY if a licenced carer is available AND other nearby bats are not stressed or show signs of lift on approach.
- Seizuring flying-foxes should not be removed from the camp if there is not someone licenced for euthanasia immediately present, as dying unaided in the presence of humans will be far more stressful for the animal.
- If the bats are tolerant of a quiet approach, an attempt at spraying with water and a backpack spray can be attempted.
- Start gently with the stream as a good spray…DO NOT MIST in a high humidity event, (>70% humidity) as this only worsens the situation through heightening humidity levels.
- Gradually increase the intensity of the spraying so that each bat gets saturated directly with water.
- Move on to observe the next area and come back and observe the previously sprayed bats after 15 minutes.
- After three (3) attempts at good spraying – those remaining bats that have not responded (i.e. climbing back into the mid-storey) should be taken for triage.
- Do not immediately remove orphans that are roosting in trees, as mothers will often come back for babies once the situation has settled. It will become apparent over the next 24-48 hours if juveniles are truly orphaned.

Figure 6 Collapse

- Ideally all bats brought in for triage should be seen at a wildlife veterinary facility, as all of them will have systemic damage due to heat stroke which can only be addressed adequately and humanely with intensive veterinary treatment.

4.0 SITE MONITORING & INFORMATION DISSEMINATION

- At the Logan HSE Forum, there was consensus of the need for monitoring camps at regular intervals throughout the year to gain a better understanding of specific camp behaviour. Understanding normal behaviours of camps help to understand when abnormal behaviours are occurring. Monitoring of camps in the lead-up, during and after events is necessary.
- The Logan Forum attendees discussed the need for more teams to be educated in reading camp and flying fox behaviours.
- The Logan Forum attendees identified the need and moved to establish a 'SEQ Disaster Management' Facebook page with strict terms of reference and for regional coordination of events, education and admin scrutiny of posts. It is located at the following link - https://www.facebook.com/groups/187708728487898/

- Other tools are available to help monitor weather outlook, current temperatures, potential heat stress events forecasting and flying-fox roost information:
  - Bureau of Meteorology (BOM) http://www.bom.gov.au/
  - Flying-fox Heat Stress Forecaster https://www.animalecologylab.org/ff-heat-stress-forecaster.html
  - Weather zone http://m.weatherzone.com.au/
  - National Flying Fox Monitoring Viewer http://www.environment.gov.au/webgis-framework/apps/ffc-wide/ffc-wide.jsf

- Looking forwards, the Forum attendees identified that it would be ideal to gain funding to obtain:
  - Data loggers (temperature and humidity) in camps –
  - Remote cameras in camps to enable remote behaviour monitoring; and
  - Regular personnel to monitor flying-fox roosts
  - Pre-event heat event triage and trauma care training for consistency in approach
  - Orphan and adult flying-fox care with an emphasis also on disaster management and triage consistent across all carer groups.
  - Consistent handling and safety training across all groups

5.0 COMMUNICATION

There is a clear need to enhance the communication of HSE's both within the rehabilitation and rescue networks but also more widely in the local community.

Multiple flying fox rescue groups exist in SEQ and a multitude of sites effected by HSE exists which can create difficulties and inefficiencies in resources where communication is lacking.

FACEBOOK COMMUNICATION SITE

A *Flying Fox Disaster Management Forum* Facebook Group was identified within the Logan 2017 HSE forum as being a useful tool to enhance communication within the operational response groups.
https://www.facebook.com/groups/187708728487898/

The Facebook group is established to "*aid in response coordination and information dissemination related to Flying Fox Disaster Management, including heat stress events, starvation events, storm events and any other event involving multiple camps and/or flying foxes."*

The group will operate as per the following points which were proposed at the Logan Forum:

- Have a rotation of Council officers acting as site moderators.
- Include standardised communication leaflets to use in disaster events.
- Store relevant information / protocol / documentation.
- Real time videos of behaviours can be uploaded and consensus can be made on whether a response is required or further monitoring.
- Allows for structural framework support for disaster management PPRR – prevention, preparedness, response and recovery.
- Ensure that information is standardised and correct for media and community information.
- Debriefing events post disasters, to offer support and fine-tune responses for future events.
- Identify training requirements. Responses and triage are very varied with considerable variation between groups.
- Training on camp monitoring and bat behaviour identification associated with disaster responses.
- Training on smooth coordination, role defining and deployment of resources in a disaster event.
- Allow dissemination of information about 'at-risk' camp activity and the need to deploy resources and/or people to affected areas.

MEDIA AND COMMUNITY

Various options exist for general community awareness raising of HSE's. These include:

- Pre-prepared standardised statements or flyers to physically letter-box drop with a list of key message points, so that correct and consistent information is disseminated to the community and/or media. It is important that common messages of communication are used.
- Local bat rescuer getting to know locals as well as foster links with local government.

Examples of strategies in action include:

- Standardised media releases and letter box drops - ***Refer Appendix 14.5 - community letter box drop flyer.***

- Door to Door approaches to local community directly affected by HSE.

- Bi-monthly community newsletter – 'camp neighbours' – e.g. Sunshine Coast Regional Council.

- Distribute the Living with Flying-fox brochure.

- Call centre scripting (including after hours) for Council's – Ipswich City Council update call centre scripting – business hours.

- Information signs at colonies with contact details for site coordinator/ rescue group/s; including temporary corflute signs at key times. – i.e. have pre-prepared corflute signs that are erected at camps during HSE peak times with information and contact numbers. Needs to be organised with local council.

Care must be taken regarding media contact protocols, particularly involving Council Officers.

With regards to media content, have pre-planned media statements or key points to get across so to stay on message. Appoint a Media Spokesperson who is not in the hot zone, preferably a person that is in charge and is not in the thick of the rescue, so they can be objective and look professional in the media to instil confidence in public.

Any media information needs to focus on the environmental and economic value of flying-foxes, as well as the human aspect, whilst also addressing any health concerns that members of the public may have.

Reinforce the existence of Flying-fox local networks and show the community that there are plans in place to both help the bats and protect the community and that Groups and Local Government are on the same page.

GENERAL COMMUNICATION BETWEEN OPERATIONAL RESPONDERS

Various stakeholders exist at roost sites and during HSE's. The following table is a guide to identify stakeholders who should be informed and/or included with options on methods of contact and suggested timeframes.

Who	How	When
Landholder, local resident, local business	Letter box drop flyer / Phone / Email/ Verbal site visit. Get alterative contacts if land owner is not available	Pre / leading up to an Event (set up triggers i.e. Temp is predicted to hit …. In this location on this day etc
Resource Providers (E.g. water trucks etc)	Phone / Email / name and address of company	Pre / leading up to a HS Event (set-up triggers) i.e. Temp is predicted to hit …. In this location on this day etc... (? Water truck availability, access issues)
Wildlife Carer Groups & Support People	Phone / Email/ Social media / Groups internal coms network (private FB & Chat groups etc)	Pre / leading up to an Event (set up triggers i.e. Temp is predicted to hit …. In this location on this day etc
Wildlife Hospitals	Phone / Email / Address	Leading up to an Event
Reporting – HSE Website, Local Councils etc	Phone / Email	During and After Event Ideally Pre / leading up as some Councils can assist in releasing a public FB post

Table 1. Identified stakeholders and methods of communication for pre, during and post HSE

On site coms via mobile phone (delegate one phone number as a point of contact for the site with a back-up number) this will preferably be someone who is in charge of signing people on, Logistics etc and if available UHF (CB) Radios and Runners/ messengers to communicate with the rescue site. It is also recommended, to have in the sign-on area, white boards or some sort of notice board to provide basic information.

6.0 RESPONSE GUIDELINES

Below is an overview of the process in response to a flying-fox disaster using the PPRR methodology relating to **Prevention, Preparedness, Response and Recovery.** This is then followed by detailed information on each section for further reference and guidance.
The HSE Forecaster may provide a few days notice as to a potential heat stress event, so a large part of a successsful response is preparation. If a HSE is predicted and the decision is made to respond, then clear criteria based on the environmental conditions, roost characteristics and the progression of the bats' behavioural responses to the heat on the day, will determine the timing of intervention. It needs to be recognised that it is not likely possible to save every bat on the day and a triage plan should be followed to achieve the ultimate aim: *to minimise flying-fox suffering and deaths*.

PREVENTION

- Ensure that camp vegetation structure is as intact as possible, having canopy, mid-storey and lower/understorey vegetation as a refuge. Undertake vegetation rehabilitation to improve this where required.
- Aim to maintain camp vegetation structure where possible when any vegetation management plans are formulated.

PREPAREDNESS

- Ensure that carers are well versed in flying-fox behaviour.
- Know local colonies. – consider having personnel assigned to regular monitoring of camps during the year to get to know the camps behaviours.
- Regularly and carefully monitor weather forecasts and camps
- Ensure that carers are aware of plans in advance and have all the information on response plans, communication chains and locations of resources in advance of any issues arising.
- Ensure good communication channels exist to disseminate information.
- Facebook communication site – ensure that all relevant plans and triage templates are readily available and information can be efficiently and easily disseminated should an issue arise. This may assist in coordinating volunteers monitoring camps.
- Ensure that all community and media information is correct and standardised to facilitate the consistent and correct information being provided to the general public on what is happening as soon as possible, or in the lead up to a possible event.
- Contact your local Council Wildlife/Environment Officer to inform/advise of potential activities. This is also useful in the event the Council has trained and available staff to assist in HSE preparedness and response.
- Ensure that the location of any resources is known, maintained and stocked correctly.
- Roles are clearly defined and the contact details of members involved in specific roles is easily accessible.
- Paperwork for data collection including site- induction sheets, tag numbers and bat details are all ready and stored with triage and rescue equipment in advance. Refer Event Data forms provided in **Appendix 14.2 and 14.3.**
- Ensure that all recording paperwork is standardised so that it can be compiled in the event of a multi-location disaster.
- Ensure that maps including access points to camps are available to everyone (FB site) – include UBD references, address, and GPS coordinates, mud maps.
- Have a standardised mud map of each known susceptible colony in advance with the locations for best set-up of a triage area and a list of available nearby resources in advance – e.g.; evacuation points in the

event of a bushfire; triage locations; division quadrants in the roost; volunteer resting area away from triage; signage locations; sign-in/out locations etc.

- Triggers for monitoring, responding and recovery stages - E.g. Heat Stress Forecaster website has indicated a high risk - discuss need to respond on Flying-fox Disaster Facebook site and trigger response.
- List of close-by facilities - wildlife hospitals, vets that have vaccinated staff and are happy to take flying-foxes, service stations, hospitals (human), shops (for welfare, consumables, gloves, ice), and local government.
- The HSE plan should be scalable from a 1 day to a multi-day event.
- Have role responsibility guidelines so groups can work out who is rescuing, transporting, working in triage, caring off site, who will replace the first wave of rescuers in a multi-day event etc.
- Have reliable links for information like BOM, Met-eye (also has a user-friendly interface), local FB pages, Local Government.
- Have up to date contacts for Local Government, land holders happy to allow access, local and nearby bat groups /rescuers / carers.
- Risk assessment and fatigue management guidelines including a roster system to allow rotation in the event of the incident scaling up to a multi -day.
- Transport protocols, container types, transport danger signs, who should transport, how to ''package '' the Bats in the vehicle whilst transporting them safely to the hospital or off-site carer.

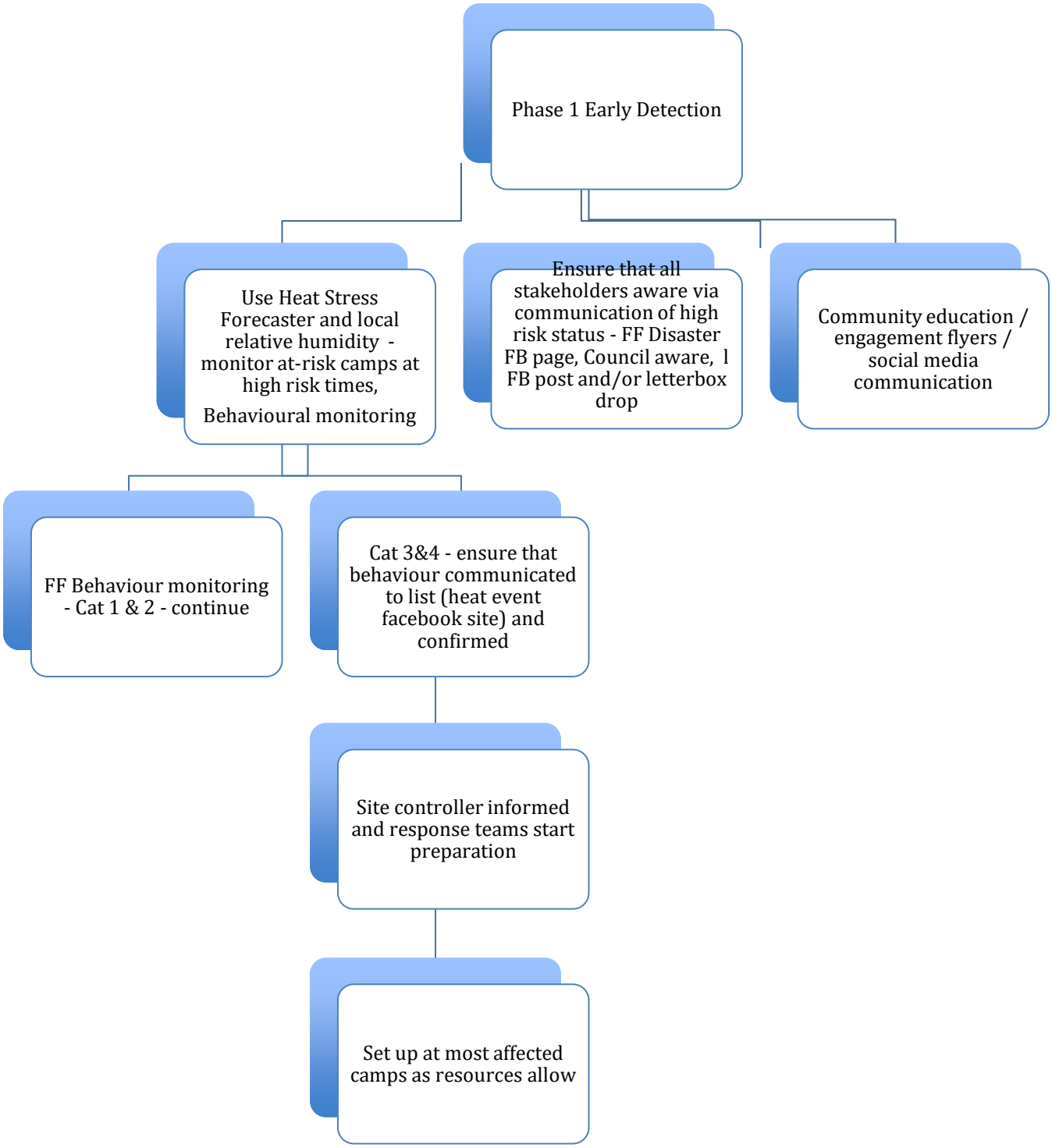

Figure 7. Flow chart of a prepared response to a HSE

RESPONSE

The ability and timeliness of responses will depend on the sensitivity of the camp, availability of resources, environmental and site conditions.

The monitoring of flying fox behaviour is essential to determine appropriate and relative scale of responses.

- Inform local Council contact. – some councils will have an approved response team to aid with public engagement and information.
- Ensure that public communication has occurred in lead up to event – if signs indicate a need to respond, ensure that all equipment boxes have been audited and are completely stocked and that communication with all stakeholders both direct and via social media has occurred. Carry out public communication methods.
- Once confirmed that a response is to occur – establish personnel available to attend.
- Site controller to co-ordinate communication with personnel in each role and trigger communication.
- Site should be set up as per the protocol of logistics on site.
- Roles should already have been established.

The following behavioural guide (Table 2) and decision support tree (Figure 8) will assist in the deliberations of a HSE intervention:

Behaviour		**Response**
Cat 2	Wing fanning	Observe
Cat 3a	Shade seeking	Observe
Cat 3a	Clustering	Observe / prepare for possible response
Cat 3b	Clumping/ Licking	Observe / prepare
	Salivating	Observe / prepare
	Panting	Observe / prepare
Cat 4	Bats on ground / disorientated	Observe in sensitive camps. (those with flighty / stressy flying-foxes) In tolerant camps - Direct spray 3 times with 15-minute intervals. Retrieve to treat only if vet or euthanasia carer is on-site, leave in-situ if not.
	Falling from trees	Observe in sensitive camps. In tolerant camps - Direct spray 3 times with 15-minute intervals. Retrieve to treat only if vet or euthanasia carer is on-site, leave in-situ if not.
	Seizing / non-responsive	Observe in sensitive camps. In tolerant camps - Retrieve only if euthanasia carer is on-site, leave in-situ if not.
	Deceased	Observe and monitor. Leave if possible for several days if a lactating female is dead. Pups are known to come down to rest with deceased mother several days after dead, making live pup retrieval easier.

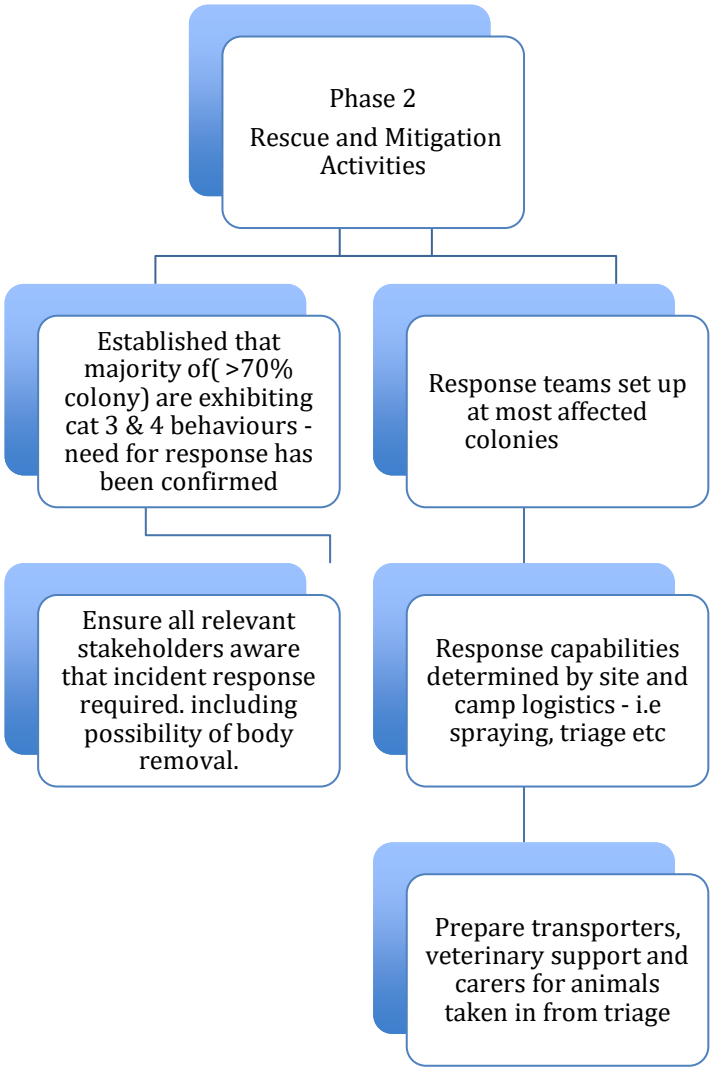

Figure 8. Response flow chart to a phase 2 Rescue and Mitigation HSE

RECOVERY

Both Incident Debriefing and Data Collection are essential if we are to collectively learn from events and improve our practices into the future.

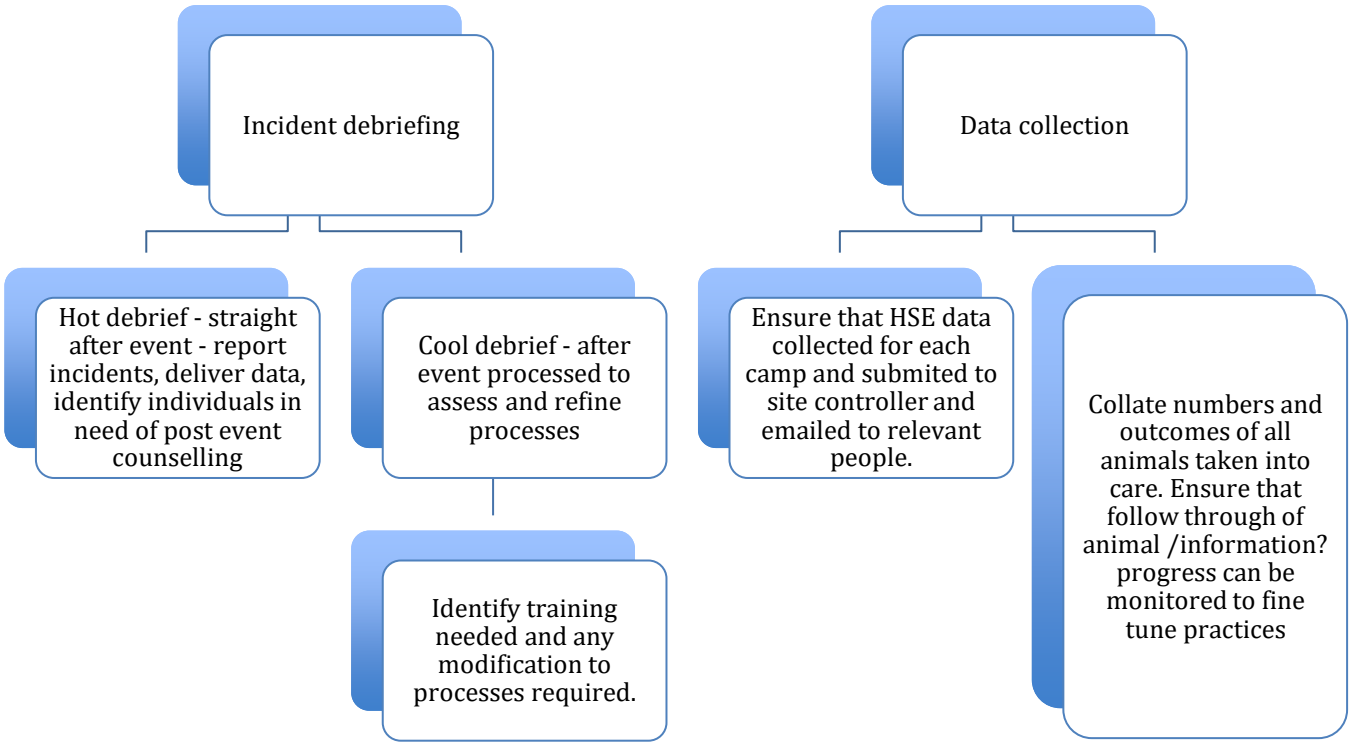

Figure 9. Recovery

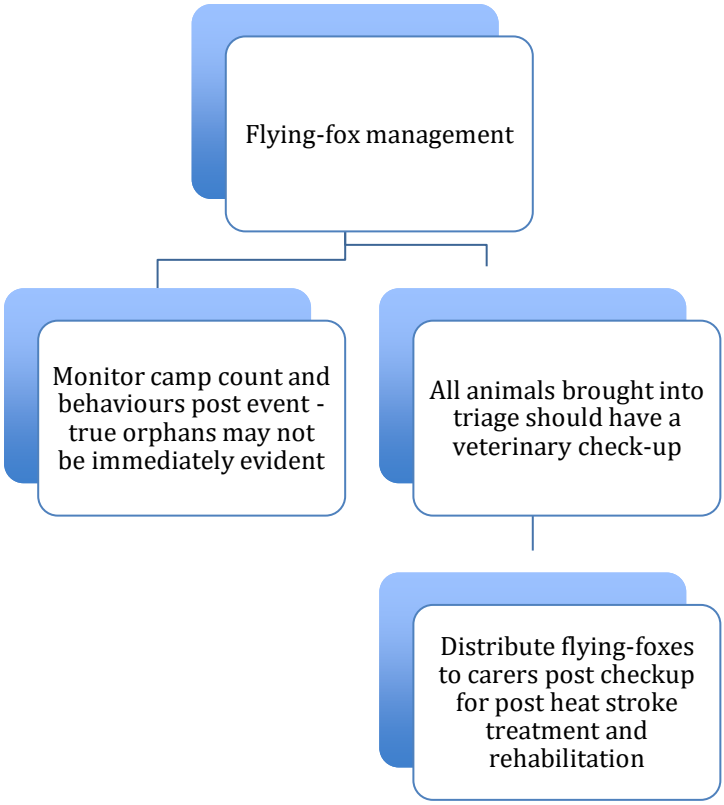

Figure 10. Flying-fox management flowchart

RESPONSE

- Veterinary treatment and sending any bats taken in for triage to carers – document progress and outcomes for these bats including all relevant medical data need to be collated in order to later refine responses and follow up on success of post treatment bats.
- All post HSE orphans also need close follow-up and data on growth rate and health issues through care.
- Any bats found dead or alive with bands attached need to be reported to http://www.environment.gov.au/science/bird-and-bat-banding/get-involved/report-band-sightings
- Any bats with radio-tracking collars need to be reported also. (details should be on the radio tracker).
- Hot and cold debriefs – can be an SEQ wide event if a HSE has occurred at multiple sites – Correct information collected
  - Facilitates emotional support of those involved;
  - Allows analysis of techniques that worked, did not work and how procedure can be modified and/or improved;
  - Also allows evaluation of response – in cold debriefs – was protocol carried out? Was it effective? What could be changed or improved?
- Ensure, you take the time to review and ask if there were there other factors involved which caused that particular camp to be more susceptible? Can anything be done to avoid that in the future? E.g. camp rehabilitation.
- Data should be collected using the form located in **Appendix 14.2 and 14.3,** and the completed forms sent to the individuals listed on the form in addition to the carer group and Local Council where requested.

WORK PLACE HEALTH & SAFETY - WH&S (PHYSICAL & EMOTIONAL)

What WH&S Procedures need to be in place?

- WH&S, induction; triage parameters; transport and media / public information standardised across camps.
- Ideal to pursue opportunities for Collective / Shared Workplace/Occupational Health & Safety Policies and Procedures between Groups.
- HSE's should be viewed as 'Incidents' - Treat events as 'Incidents' with a formal Incident Controller.
- Each rescue / response will vary based on camp logistics.
- Ensure that anyone handling bats is vaccinated and is easily identified. Responders having copies of vaccination certificates handy in printed form or copies on their phone can do this. Groups should have a list of vaccinated people and copies of proof that they are up to date with vaccinations. One option is having simple armbands in certain bright colours for vaccinated and non-vaccinated personnel so they can be utilised more effectively.
- Rescuers tagging bats with toe tags will also help with identification of bats if a scratch or bite occurs.
- Have dedicated personnel, who are there to look after the rescuers welfare, someone who can stand back and watch the responders and identify anyone who needs to take a break, hydrate etc. This can be the same person who acts as a Safety Officer, First Aider; Organiser of personnel on that site etc. And should be someone who is not doing hands-on rescue.
- Rescuer's welfare to be aware of: emotional fatigue, physical fatigue and heat exhaustion.
- Support the people involved by providing a breakout area and have someone who is away from the rescue site who checks on them and acts as a peer supporter.

For roosts located on Council reserves, Council WH&S requirements for operations on Council Property may apply which may include Inductions, Safe Operating Procedures, Toolbox Talks etc. Speak to your local Council Wildlife or Environment Officer contact for more information.

HSE's are stressful and emotive. The emotional toll on all parties responding to a heat event is grossly underestimated.

How best to support the people involved in these events:

- Briefings pre and post events – hot and cold debriefs – Hot debriefing allows data collection and all pertinent, immediate information to be exchanged whilst still fresh in people's minds. Cold debriefing allows review of the responses after processing has occurred, to discuss outcomes and where procedures can be improved / modified.
- Ensure that grief counselling or general counselling is available to those that need it.
- Assistance in talking to people who may require counselling but may not be able to identify it.
- "Drills" to help rescuers feel prepared and emotionally ready for the event.

7.0 HSE RESPONSE LOGISTICS

Each camp is unique, however the HSE operative should be the same. What on-site features need to be identified at a HSE site? What resources and equipment needs to be on standby? How do we enact their availability?

Feature	Details	Enaction
Site Access Permission & Landholder Support	Access approval (best arranged pre-event), identification of any existing Planning and Response documentation (E.g. Moreton Bay Council's)	Obtain maps / mud maps of all camps to identify these and logistics of responses
Access Logistics	Locked gates, parking, footpaths or tracks, no-go zones, maps/ fences	Obtain maps / mud maps of all camps to identify these and logistics of responses - each group to take mud map and using triage logistics prepare a plan including site controller position and sign on, any barriers to protect MOP, information signage, evacuation points, triage setup - identify local amenities
Health and safety	Needs to be identified in roles – under induction / site controller and first aid officer Headquarters / operative tent, inductions, sign in-out sheets, first aid, drinking water, shade, wash station, PPE. Sanitary amenities. Any amenities? Part of any pre-plan for a rescue site is to ID amenities close by like Shopping centres, service stations , Private residences Evacuation points	***See Appendix 14.7 & pg. 16*** - HSE Roles See Templates – ***Appendix 14.2, 14.3, 14.4*** - Induction site form - Data - Camp monitoring – number, species and behaviour recording
Infrastructure	Water, power, shade structures, toilets.	
Resources	backpack sprayers, water trucks. Marquee, shade structure, trestle tables	If available to site, assess in advance and enact use as soon as possible after response initiated. Care with use of generators and noise involved stressing bats.
Rescue and care	Triage area, rescue / transport access and process Rescue Equipment - cages, poles/nets, wraps. See Following Sections in this plan TRIAGE – Setup, Equipment and Roles	See following sections in this plan: ***See pg. 30-33*** - TRIAGE PROCEDURES - SET UP PROCEDURES AND EQUIPMENT - RESCUE AND RECOVERY PROCEDURES

Drivers	Animals to wildlife hospitals / carers - Can also deliver supplies needed for wildlife rescue as well as items needed to support responders. E.g.; additional water, food etc.	Have on standby when HSE are predicted and inform when responses initiated.
Receiving Sites / Treatment Facilities	Veterinarians / Wildlife Hospitals on standby	Have on standby when HSE are predicted and inform when responses initiated.
Rehabilitators	Carers to receive animals after Veterinary assessment and treatment	Tracking of animals post heat stress treatment - See template post response data.
Body Disposal	Landholder and/or Council involvement	Request
Existing Documentation	Create a template based on information included adapted to your camp and group	Prepare in advance

8.0 ROLES

Successful HSE responses require many and varied roles requiring differing skill and fitness levels. Roles can include:

Roles	Responsibility	Who? (e.g. Council, carers, vets, community, business)
Coordination	Coordinators from each different region – utilise Facebook page to mobilise and direct help where most needed	Carers Senior members who have done some training or have a good understanding of a HSE ***See page 24***
Colony monitors	Get to know camps regularly – i.e. maybe quarterly checks to get to know nature of camps and normal behaviour Local Group /rescuers / carers or Local Gov.	Carers / council wildlife officers / local MOP with an interest Senior members who have done some training or have a good understanding of a HSE
Communication	Facebook page / trigger disaster event / message from Facebook page out to relevant people Local Group /rescuers / carers or Local Gov.	Carers , area coordinators / council wildlife officers Senior members who have done some training or have a good understanding of a HSE ***See page 24***
Set up and pack up	Local Group /rescuers / carers and Local Gov. Have pre-prepared list of all equipment required at a disaster event and where it will be stored with a brief mud-map of how it should be set up for differing events. Keep a stocktake of what is there and replenish used items	Carer / vaccinated or non-vaccinated Support personnel ***See page 24 & 29***
Safety officer	Safety officer could be site coordinator / induction person –would be best if safety officer and human first aid were together • Local Group /rescuers / carers or whoever is responsible for the land the colon is on i.e. local Gov, will need to appoint one.	Council personnel, non-vaccinated support personnel, someone who has had some training in this field in their work or volunteer role, someone who is responsible for the site i.e. knows the location very well including any hazards.
Human first aid	Safety officer could be site coordinator / induction person –would be best if safety officer and human first aid were together	A trained and current first aider ***See page 24***
Induction / scribe / data recorder	Can be non-vaccinated – need pre-prepared sheet of everything that needs to be recorded at a site – i.e.; time of arrival – temperatures; names and contact details of all people attending and vaccination status; ensure everyone wearing correct PPE and taking adequate rests / rotations	Support personnel – i.e. can be non-vaccinated ***See page 23***

	Ensure that all bats taken into triage are tagged and recorded	
Rescue	Local Group /rescuers / carers	Anyone who is vaccinated and is trained in flying fox rescue ***See page 24 & 25***
Spraying	Local Group /rescuers / carers	Anyone who is vaccinated and has had some training in is spraying flying foxes ***See page 24 & 25***
Triage and post triage monitoring	Local Group /rescuers / carers	Anyone who is vaccinated and is trained in flying fox caring, Vets and Vet nurses Ideally, they should focus solely on triage and stabilisation. ***See page 25***
Euthanasia / drug licence	A Vet or Licenced Trauma Carer	Anyone who holds a valid drug permit from QLD health and has had some training in euthanising flying foxes
Drivers	Local Group /rescuers / carers	Rescuer/Support personal vaccinated unless the bats are in 100% secure containers for transport ***See page 24***
Carers on standby / sitters	Local or other groups/rescuers/carers	Anyone who is vaccinated and is trained in flying fox caring, Vets and Vet nurses ***See page 24***
Food, water provision	Local Group /rescuers / carers and Local Gov	Support personnel
Body removal	Local Group /rescuers / carers working with Local Gov	Anyone who is vaccinated and is trained in flying fox rescue ***See page 25***

NOTES:

- Ensure where possible that the camp has been divided in quadrants with thumb tags supplied with colours corresponding to quadrants that flying-foxes were taken from – these numbers are the transferred to any paperwork and stay with the flying-fox throughout any care / veterinary treatment.
- Also need to ensure that the site coordinator / inductor assigns rescuers / sprayers to a quadrant so that any bats can be identified if any human/bat contact incident occurs.

DETAILED ROLE DELINIATION

ROLE – SITE INDUCTOR / INCIDENT CONTROLLER/SCRIBE–

- Should be one incident controller, 1 scribe and 1 site inductor. Can be non-vaccinated volunteers to inform members of the public what is happening and to keep them out of the working site.
- Set up clear and very visible barriers to the working site with standardised signage indicating that a heat event is taking place and only trained personnel are to pass the barriers. If this is a public area, a small through-way furthest from the site will need to be granted and fenced off.
- Ideally divide colony up quadrants and assign rescuers / sprayers to set quadrants.
- Standardised leaflet drop goes to neighbouring properties.
- All people on site to sign in with induction officer including contact details / emergency contact person (next of kin), vaccination status and role at the site. Refer **Attachment 14.4** for volunteer sign-in / recording sheet.
- Ensure (and mark off) that everyone has the correct PPE for their role on site – i.e.; hat, gauntlets, nitrile gloves, long sleeves and pants, gators and sturdy shoes.
- Collate numbers of animals brought in for triage including sex/ age / species.
- Record approximate numbers of deaths at the site and deaths during triage, recovery or transport/ bats taken into triage and id numbers / bats that go to veterinary care and where they were taken.
- Get tag colours and ID numbers of bats, prior to being taken into care and where in the colony that bat was taken from.
- Record the temps and interventions of the rescuers, as well as timing and duration of sprays and responses of the bats.
- Record number going to veterinary care and identification.
- Important to record responses to sprays - positive or negative for future response tailoring.
- Recruit volunteers to record details of bats coming into triage, vital signs and treatment given prior to going to veterinary care – ensure that all bats coming into triage have some form of ID tag.
- Record any human first aid incidences and follow-up that appropriate action has been taken.
- Ensure that when volunteers/carers leave the site they sign-off.

ROLE - COORDINATION / COMMUNICATION

- Can be non-vaccinated person looking at bat forecaster and Facebook site, coordinating teams of people to respond to camps with highest need.
- Support personnel.
- Council Liaison

ROLE – TRIAGE AREA SET UP AND PACK UP

- Can be non-vaccinated people
- Support personnel

ROLE - FOOD AND WATER PROVISION

- Also can be non-vaccinated volunteers – important that adequate water and food is at each site as each person responding will need a minimum of 3-4 litres available depending on time spent at the site.

ROLE - CARERS ON STANDBY

- Ability to triage and rescue flying-foxes will be limited by how any vaccinated carers are available to take on heat-affected bats post veterinary assessment.
- Need to have an idea of capacity and availability of carers able to take on adults as well as juveniles affected in a heat response.

ROLE - SAFETY OFFICER / HUMAN FIRST AID OFFICER

- Full first aid kit / ideally first aid certificate.
- Water for all participants -Large water containers for backpack water containers – (Camelbak etc.).
- Ice vests.
- Ensure that people are rotating out of the heat into shaded areas. Pull out anyone not coping or becoming faint and unwell etc.
- Record the time that each rescuer started working and when they finished.
- Ensure that each rescuer is wearing the appropriate PPE for their task.
- Record any injuries sustained.
- Record any scratches/ bites and identify quadrant that bat came from in addition to the specific bat involved.
- Record each person entering the response site, including their contact details, emergency contact person (Next of Kin), vaccination status and roles.
- Mark off that they have been given the appropriate level of PPE for their role.
- Record any human health incidents., and sign personnel out when leaving.

Refer to Appendix 14.4 for Volunteer sign-in and 14.3 Recording sheet.

ROLE - COLONY MONITORS

- Ideally people who know the colonies well, know bat behaviours well or have been trained in camp site event monitoring.
- Monitor the colony leading up to and during the heat event.
- Advise Rescue Personnel and Sprayers of need to intervene and timing of any spraying interventions.
- Also monitoring groups of bats that have been sprayed and the response to spraying, to determine need for removing-flying-foxes for triage, euthanasia or positive response to spraying.
- Monitoring post event for orphaned juveniles.

ROLE - RESCUE AND SPRAYERS

- If numbers permit, send Rescuers and Sprayers to known quadrant areas identified within the camp, so that all bats that are returned from those volunteers can be identified with a thumb tag as to which location in the camp the bat came from.
- When advised by Colony monitors, Rescuers and Sprayers will remove those animals in need of euthanasia or immediate triage.
- When advised by the Colony monitors, Rescuers will ascertain if bats will tolerate spraying. This needs to be very carefully monitored as any additional stress at this time could cause lifting, with stress leading to possible death. If tolerated, lightly increase the intensity of water and ensure that bats are sprayed directly to effectively saturate them. Once achieved, give an interval of 15 minutes, observe and reattempt spraying again up to 3 times, if tolerated. Success is measured by bats moving back up into the mid-storey.
- Advise Monitors and Site induction personnel which bats , from which quadrants of the camp, have been sprayed, when ,for how long and how many times they have been sprayed.
- Discontinue if bats are showing ANY signs of stress and/or trying to move away.
- Ideally place thumb tag indicating the quadrant of which colony the bat is from. The thumb tag information identifies the bat for further treatment and to ease tracking if any human exposure issues or bat related quarantine issues. This also allows tracking of treatment and responses of bats, to improve feedback and data that we have on our responses.

ROLE - TRIAGE PERSONNEL

- Ideally need at least one (1) person licenced in wildlife euthanasia and sedation practice by QLD Health.
- Triage and initial stabilisation of flying-foxes delivered from camp by rescuers.
- Triage and stabilisation of orphans.
- Preparation of flying-foxes for transport to veterinary care

ROLE - BODY REMOVAL

- Any animals euthanased via Lethe barb will need to be separately placed in body bags, and not left on-site.
- Otherwise Council usually carries out mass body removal at some sites. Need to liaise with roost site landholder.

9.0 RESPONSE EQUIPMENT AND SETUP

OPERATION SET-UP

Ideally separate the site into zones required for response operations on-site, namely:

- Site controller/ sit induction point / scribe
- Triage area
- Flying-fox stabilisation and recovery
- Rescue supplies and rest areas including sprayer refill sites
- First Aid areas
- Transport preparation area

Set up clear barriers to demarcate zones, including:

- Cool zones where non-vaccinated people can be present
- Clear hot zones where strictly only vaccinated people can be present

Ensure:

- Clear signage and barriers are erected to keep members of the public safe.
- Have jobs handy such as water collection, food provision etc. for concerned members of the public to feel included without impeding progress.
- Ensure that clear evacuation / exit points are defined in the case of bushfire.

PPE FOR PARTICULAR ROLES

TRIAGE

- Triage – gauntlets
- Niltrile gloves

RESCUE

- Long pants
- Gators
- Enclosed sturdy shoes
- Long-sleeved shirt
- Hat etc
- Nitrile gloves with or without thick leather gloves and gauntlets
- Water - minimum 3L per rotation

TRANSPORT

- None required once animals in enclosures

All non-flying-fox contact roles, and roles not requiring entry into bush do not require specific PPE. However usual sun protection is recommended as well as personal water.

SITE SETUP EQUIPMENT

The following list of equipment is recommended for Response Operations:

- Laminated list of all equipment in relevant containers with checklist for lost/broken/used items
- Community information flyers
- Standardised protocols and role outlines
- AM/FM Radio – Emergency updates
- Map of camps and mud map of triage and rescue site locations including possible evacuation points
- Traffic / barricading material to keep unvacc / MOP out
- F10 hand wash
- Back pack sprayers with extension nozzles
- Saw
- Multi-tools – (e.g. gerber)
- Human first aid kits – including snake bite bandages
- ID tags
- Hats or wrist bands to indicate roles in camp
- iPhone / cameras for recording bat behaviour
- Water containers (human drinking)
- Backpack water carriers (human drinking) - ? camelbak or similar
- Water (spraying bats)
- Ice vests for people
- Shade structures
- Foldable chairs
- Trestle tables – induction site, rest sites, first aid
- Clip boards / iPad if available for data recording
- Head lamps
- Bat thumb tags
- Pens / pencils and masking tape for labels
- PPE – nitrile gloves, gauntlets, gators, sturdy shoes, Face masks
- Personal care pack (personal meds; headache tablets; snacks; specific dietary requirements)
- Check list to record equipment needing replacing for further responses
- List of local amenities, service stations, Council contact.

TRIAGE ZONE SET-UP

TRIAGE EQUIPMENT

GENERAL ITEMS

- Standardised protocols and role outlines
- Esky and ice
- Battery operated fans – at least 9 per site
- Trestle tables – 3 – initial triage, fluid table and third for post fluids monitoring.
- Good lighting – halogen lamps
- Spray bottles and tepid water
- Cages – open wire for increased circulation
- Towels – large and small
- Thermometers
- Body bags
- Water – camel backs for people or adequate cool water
- Ice vests – people
- PPE – gauntlets; nitrile gloves, hats, gators- sturdy shoes and long-sleeved shirts and pants
- Shade structures
- Hand washing stations (tubs)

- Cages- transport and holding
- Head lamps
- Body bags
- Check list to record equipment needing replacing for further responses

CONSUMABLES

- Syringes various sizes – 1ml (50 minimum), 3ml (50 minimum) 10ml (50 minimum), 20ml – (50 minimum) 60ml – (50 minimum)
- Needles – 25G; 23G; 18 G- 1 inch (100 each minimum)
- 2.5% glucose saline fluid bags 500ml bags – 2 minimum – (need to be refrigerated after first use)
- Hartmann's fluid bags 1L – 4 minimum
- F10 hand wash
- Vet wrap – 2 x 5cm diameter rolls per response
- Tubigrib – medium 1 x roll
- Fixomul tape – 1 roll
- Self-warming hot packs – pack 50
- Gauze swabs – pack 50-100
- Alcohol swabs (not for cooling) – 1 tub per table – alcohol in cotton balls)

MEDICAL EQUIPMENT

- Stethoscope
- Pulse oximeter (if funding allows)

MEDICATIONS

- Trauma carer drug permits – (only if personnel with valid and current permit are present) pamlin; lethebarb; alfaxan; fluids (must go in lockable safe below)
- Lockable portable safe
- Betadine
- Flamazine ointment
- False tears / lacrilube
- Glucodin powder

IMPORTANT NOTE:
Attempt to avoid Hi Vis vests for identification of people dealing with bats to avoid distressing bats. Investigate alternate options – coloured hats, wrist or arm bands. However, this may not be optional as some sites and land managers require High Vis vests when undertaking work on reserves or other locations as part of their WH&S policies. Check with your local council.

10.0 TRIAGE PROTOCOL

Ideally at least one (1) person licenced in wildlife euthanasia and sedation practice by QLD Health should be present during response operations.

Bats that have responded to three (3) sprays and have shown great improvement in demeanour but not 100% - give 10% SC fluids – (50:50 2.5% Glucose/saline and Hartmann's).

NO bat brought in from a heat event should receive hydration via oral fluids.

- All bats that have been brought in from a heat event, that have not been returned to the camp, up the tree, require veterinary examination, as they will have organ damage due to heat stroke.
- Brighter bats that have responded to spraying and have a stable rectal temperature after spraying, can be kept in care for 48 hrs and then returned to wild or released if no veterinary facilities are available.

TRIAGE - ALL BATS THAT REQUIRED MOVING FROM CAMP FOR TRIAGE

- Bats not responding to spraying or that appear to be deteriorating despite spraying, or are not responsive at all during spraying, need to come in for triage / veterinary treatment.
- Those with obvious injuries and seizuring animals need to come in for triage / veterinary treatment.
- Need to use judgement as to whether you remove the seizuring animal or non-responsive / injured animal at the risk of not being able to spray a large group and/or disturbing them. Remember any additional stress at this point could mean death for all of the bats in a group.
- Ideally give any responsive Bat Pamlin @ 0.5mg/kg IM if licenced to do so. This helps with myopathy and reduced anxiety of handling and further increasing of body temperature.
- Any seizuring animal give 1mg/kg IM or per rectum (Pamlin will absorb per rectum even in shocky bats and may be safer than giving an injection to a seizuring animal)
- Glucose should be administered orally (either a glucodin powder paste or less than 1ml of concentrated liquid; or on gums as well as in SC or IV fluids. Glucose will cross the mucous membrane into the blood stream even in quite shocky bats.
- Monitor rectal temperature initially and then every minute until the rectal temperature drops below 40°C – stop sprays with tepid water and fanning at 40°C.
- Continue to monitor rectal temperature every 2-5 minutes after this time, as shock can cause the temperature to drop rapidly going into hypothermia as shock worsens.
- Place *False Tears* in all bat eyes (gel is best).
- Note any bat that may have regurgitated (for veterinary attention) during rescue or triage.
- Leave non-euthanased dead mums in place for a few days where possible, as this often aids rescue of orphaned young who may come down from the tree.
- Bats can go into transport cages once rectal temperature and temperament has been stable at 37-38 °C and Oral Mucous Membrane Capillary Refill Time (OMMCRT) has been around 2-3 seconds or less for 10 minutes – continue to monitor these animals for regression every 10 minutes
- If seizuring recurs in these animals or temperature drops again below normal and not responding to repeating treatment – euthanasia required.
- **IF AT ALL POSSIBLE**: ALL BATS THAT ARE BROUGHT IN FOR TRIAGE, SHOULD BE SEEN BY A VETERINARIAN AS THEY WILL ALL BE SUFFERING SOME DEGREE OF ORGAN DAMAGE CAUSED BY HEAT STROKE, REQUIRING MONITORING AND TREATMENT

TRIAGE - BATS REQUIRING IMMEDIATE EUTHANASIA

- Seizuring not controlled after Pamlin, glucose and/or cooling.
- Severe respiratory distress.
- Initial rectal temperatures of >41.5°C.
- Blind / non-responsive animals.
- Animals with concurrent injuries – e.g.; fractures, severe lacerations etc.
- Animals whose rectal temperatures drop below 35°C and have Oral Mucous Membrane Capillary Refill Time (OMMCRT) of greater than >3 seconds and won't respond to SC fluids and warming

TRIAGE – ORPHANS

- Orphaned bats in a heat event may not be immediately apparent.
- Searching the camp for weak, emaciated juveniles in the days post heat event will identify those needing to be brought into care.
- Some will come down to dead mothers left on the ground up to 2-3 days after the event.
- Care must be taken not to remove healthy juveniles whose mothers may return.
- When observing the camp for orphaned young, ensure that any activity within the camp is stopped by 5.30 pm so that normally crèched juveniles are not mistaken for orphaned young.
- Orphans of a heat event will need specialised care.
- Orphaned young during heat events will also be suffering from a degree of heat stroke and resultant organ damage.
- All orphaned young in a heat event should be seen by a wildlife veterinarian in order to determine if treatment for aspiration pneumonia and adequate fluid therapy with or without gut protectant treatment is started if required.
- Aspiration pneumonia is extremely common in orphaned flying-foxes in heat stroke, as they will often be hypoglycaemic and their GI tracts are often damaged by heat and will not be absorbing nutrients and fluids normally.
- This means that their body condition and development needs to be closely monitored, as their ability to absorb nutrients from formula in care, will not be the same as normal orphaned flying-foxes.
- Fluid therapy is vitally important for at least the first week post heat event and oral feeds should not be started until orphans have been rehydrated adequately and supplemented with glucose.
- An initial feed of glucodin should be attempted – (not more than 2ml) and the amount given orally should increase gradually in order to avoid aspiration and resultant pneumonia.
- Feeds need to be increased conservatively as the GI (Gastro intestinal) tract will also have compromised ability to digest and absorb due to damage.

CORRECT TRANSPORT PROCEDURE

- Open wire cages to allow good air flow.
- Ensure that each box is positioned to allow air flow to reach all bats in transport.
- Ensure that transport has air-conditioning with or without adequate air flow to reach the wildlife hospital or carer.
- Ensure that the wildlife hospital or carer groups are aware that flying-fox patients from the heat event will require their attention and will be transported to them, so they are aware and prepared for their arrival.
- DO NOT wrap flying-foxes in transport cages. This will prevent further radiated or evaporative cooling even if the towels are wet and will continue to increase the temperature of the flying-foxes.
- DO NOT offer flying-foxes oral fluids post heat event rescue – they are at risk of aspirating.
- Ensure that all cages are secure to prevent accidental opening or excessive movement during transport.

11.0 AFTER THE EVENT – MANAGING FLYING-FOXES POST HSE

Ideally all flying-foxes that have survived a heat event and need to come in to care should see a wildlife veterinarian
All flying-foxes that survive a heat event should be held in care for at least 6 weeks, as the full extent of damage due to heat stroke may not be immediately apparent and significant recovery and rehabilitation will be required to overcome the myopathy and organ damage due to heat stroke.

All flying-foxes will have some degree of:

Gastro Intestinal Tract Damage

- This can range from full gut lining sloughing to a reduced ability to digest and absorb nutrients.
- Depending on the degree of damage, intensive antibiotic and gut protectant treatment with or without
- fluid therapy may be needed.
- All bats should be placed on gut protectants post HSE such as *Carafate* in smoothies.
- All bats will require nutritional supplementation with high protein diets.

Renal/Kidney Damage

- This can be direct from heat damage to indirect from severe dehydration.
- Fluid therapy is vitally important especially in the first 48 hours and up to at least the first week post HSE.
- Oral intake of volumes greater than 2 ml should not be attempted until rehydration and glucose supplementation has occurred and the flying-fox is showing signs of improved hydration, a OMMCRT of two (2) seconds or less and is strong enough to hang unassisted and is moving and grooming normally.

Damage to the Thalamus

- Some flying-foxes surviving the initial insults of an HSE may have permanent damage to the thalamus, the temperature regulating centre of the brain, making them more prone to succumbing in future events.
- Surviving flying-foxes (mainly adults) need to be monitored closely whilst in care, to ensure that they can thermoregulate normally prior to release.

Myopathy

- This can be exertional due to prolonged fanning to attempt cooling (often for several days leading into a heat event) or non-exertional from direct damage due to heat.
- Myopathy may be initially apparent as severe stiffness and reluctance to extend wings, move around or invert to defaecate and urinate.
- Myopathy can also be subtle and become apparent weeks into care, with muscle wasting occurring to a greater degree than expected from a normal bat in care.
- Myopathy can result in scarring or fibrosis of muscle tissue and if severe, can result in a flying-fox being unreleasable as muscle fibre damage and scarring may be too severe for regeneration to occur during the rehabilitation phase.

Vascular Bed Damage

- This is usually seen in flying-foxes as damage to the wing membranes.
- If flying-foxes survive the initial insult to vascular beds, damage to vascular beds throughout the body can become apparent as wing-sloughing or inflammation of the membranes and can be mistaken for slimy wing.
- This can occur up to 6 weeks post HSE and needs to be treated aggressively to avoid membrane scarring and contraction

MANAGING FLYING-FOXES POST HSE

Initial considerations

- Due to their high basal metabolic rates, flying-foxes are usually hypoglycaemic post HSE.
- This leads to weakness and disorientation combined with direct damage to the brain due to excessively high body temperature.
- The GI tract will also have a poor blood supply due to dehydration and shock and direct damage. Anything given orally will sit in the GI tract and regurgitation and resultant aspiration is a common and often life-threatening sequelae needing immediate and aggressive treatment.
- Hence, SC or IV fluid therapy is vital in the initial management of flying-foxes post HSE.
- ALL FLYING-FOXES SHOULD BE GIVEN NO ORAL FLUIDS other than small (up to 1ml of 50% glucose or ideally glucodin paste on oral mucous membranes), until adequate hydration has been achieved and the flying-fox is strong enough to hang and move normally and is bright.
- Even then, oral supplantation needs to be started with small volumes gradually increasing intake as tolerated.

Nutritional Supplementation

- High protein smoothies with gut protectants such as carafate should be given to all flying-foxes in care post HSE to offset losses due to GI tract and renal compromise.
- Even so, supplementation needs to be started conservatively and gradually increased whilst monitoring body condition and hydration closely.

REHABILITATION

- Adult flying-foxes taken into care during a HSE should be kept for a minimum of 6 weeks.
- Once complications have been overcome, all flying-foxes need adequate time in large flight aviaries to ensure that they are capable of increasing their fitness, strength and range of motion required for flight in the wild.
- Their ability to maintain their hydration and body condition during this time needs to be monitored closely to ensure that they will be capable of returning to the wild successfully.

12.0 HSE REPORTING

Data has the capacity to better frame our responses to HSE's as well as to provide valuable information on the effect of HSE's on the flying-fox population as a whole.

Event Data (Refer **Appendix 14.2 & 14.3**) should be entered on the Flying Fox heat stress forecaster, within which a data entry form exists. https://www.animalecologylab.org/ff-heat-stress-forecaster.html

Reporting should also occur to the relevant Regional Council and EHP via the incident or site coordinator.

- Data can be collected by having a hot debrief (immediately after the event) and then at a cold debrief later (after the event giving a good overall picture) – ensure that data collected is entered into heat stress forecaster data, but also retain a copy of any data for use locally in future responses. We need to ensure the ability to track bats post HSE treatment and care, to assess future success of bats affected that survive.
- Keep a record of lessons learnt and modifications required for future responses related to each site.

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14.0 APPENDICES

14.1 SEQ HSE CAMP STRATEGIES – GATHERED AT HSE WORKSHOP

SUBREGIONAL RESPONSES

1. HSE Prone Camps, Appropriate Response Action

- Which camps have historically had HSE and which NEW camps may be of concern?
- Based on the individual characteristics of each camp – i.e. demeanour of bats; accessibility; local resources; camp structure and vegetation, what are appropriate intervention methods for managing heat stress?

  i.e.; water truck/ute sprayers; shade provision; backpack spraying; no intervention until late stages, as bats are too unaccustomed to human presence?

GYMPIE REGIONAL COUNCIL

Camp	Tenure / Land Manager – Contact Details	Existing planning and response documents	Appropriate Response Action	Access	Site Response Coordination	Principle Carer Groups - First Responders	Resources Available and Contact Details	Site Issues	Monitoring Activities	Alternate Remediation Action
Widgee Crossing	Gympie Council Sewage Treatment Plant and Waterway	Nil	No Intervention during Event – Very stressy camp.	Good Street Access Difficult access (creek line) for large part of site.	Rachel Lyons (WIldcare)	Wildcare Annara RSPCA – Eumundi Bat Rescue Sunshine Coast	Rescue Equipment – Wildcare Basic Triage Equipment Wildcare Trauma Carer – Rachel Lyons Veterinary Support – RSPCA Eumundi & Australia Zoo Wildlife Hospital	Difficult access (creek line) for large part of site, LRFF camp in summer, Very Weedy, Very flighty camp, WH&S issues (terrain, water, dense vegetation), Maternity site GHFF & BFF.	Afternoon monitoring organised by Rachel Lyons on susceptible days. EHP 3 monthly monitoring.	Ongoing Cats Claw Creeper Vine Management (Bio control and Manual), Improve Buffering of Roost through vegetation plantings. Careful weed replacement over time. Difficult rehab site – very expensive project.
Kandanga	Private Property – Contact via Terri Ridgeway & Rachel Lyons	Nil	No Intervention during Event – Very stressy camp.	Via Private Property Access – difficult access	Terri Ridgeway (Bat Rescue)	Bat Rescue Sunshine Coast Wildcare Annara RSPCA – Eumundi	Rescue Equipment – Wildcare Basic Triage Equipment	Access requires notification of landholder and tenants. Large GHFF maternity site.	Landholder when asked.	Not known

							Wildcare Trauma Carer – Rachel Lyons Veterinary Support – RSPCA Eumundi & Australia Zoo Wildlife Hospital			
SUNSHINE COAST REGIONAL COUNCIL										
Camp	**Tenure / Land Manager – Contact Details**	**Existing planning and response documents**	**Appropriate Response Action**	**Access**	**Site Response Coordination**	**Principle Carer Groups - First Responders**	**Resources Available and Contact Details**	**Site Issues**	**Monitoring Activities**	**Alternate Remediation Action**
Palmwoods – Jubilee Drive	DTMR	Nil	Potential Spray Intervention during Event if FF's allow	Via DTMR	Claire Smith (Sunshine Coast Wildlife Rescue / Bat Rescue Sunshine Coast (Carmel Givens)	Sunshine Coast Wildlife Rescue, Bat Rescue Sunshine Coast	Rescue Equipment – Wildcare Basic Triage Equipment Veterinary Support – Australia Zoo Wildlife Hospital		HSE monitoring organised by Wildlife Rescue Sunshine Coast on susceptible days. SCC 3 monthly monitoring.	Mid-storey Vegetation Management
Landsborough	Council Reserve	Nil	Potential Spray Intervention during Event if FF's allow		(Carmel Givens) Bat Rescue Sunshine Coast	Bat Rescue Sunshine Coast, BCRQ	Rescue Equipment – BRSC Basic Triage Equipment Veterinary Support – Australia Zoo Wildlife Hospital		HSE monitoring organised by Carmel Givens on susceptible days. Bat Rescue Sunshine Coast SCC 3 monthly monitoring.	Ongoing Vegetation Management
Mary Cairncross	Council Reserve	Nil	No Intervention during Event – Observe.		(Carmel Givens) Bat Rescue Sunshine Coast	Bat Rescue Sunshine Coast BCRQ	Rescue Equipment – BRSC Basic Triage Equipment Veterinary Support – Australia Zoo Wildlife Hospital		HSE monitoring organised by Carmel Givens?? on susceptible days. SCC 3 monthly monitoring.	?
MORETON BAY REGIONAL COUNCIL										

Camp	Tenure / Land Manager – Contact Details	Existing planning and response documents	Appropriate Response Action	Access	Site Response Coordination	Principle Carer Groups - First Responders	Resources Available and Contact Details	Site Issues	Monitoring Activities	Alternate Remediation Action
Caboolture	Private Property – contacted via door knock		No intervention during event – large site, multiple observation sites	Through private property		BDWR & BCRQ AZWH	Triage area - driveway of private property BDWR Triage Trailer	No power No water	Monthly monitoring by Council. HSE – Volunteers Margaret Snowden	Replant understorey at Colburn way
Woodford	Council Reserve	Council Response Plan – Council Sites	No intervention during event – no water. Two locations.	2 access points	Gabi Friebe	Bat Rescue Sunshine Coast AZWH	Triage area – Webb Lane	No power No water	Monthly monitoring by Council. HSE – Gabi Friebe	
Burpengary	Council Reserve	Council Response Plan – Council Sites	Potential Spray Intervention	Easy Access	Byron Cann	BDWR AZWH	BDWR Triage Trailer	No power No water	Monthly monitoring by Council. HSE – Gabi Friebe	Community education
Dayboro	Private Property – Chris Frazer via Phone		No intervention during event						Monthly monitoring by Council. HSE – Landholder?	Community Education
BRISBANE CITY COUNCIL										
Camp	**Tenure / Land Manager – Contact Details**	**Existing planning and response documents**	**Appropriate Response Action**	**Access**	**Site Response Coordination**	**Principle Carer Groups - First Responders**	**Resources Available and Contact Details**	**Site Issues**	**Monitoring Activities**	**Alternate Remediation Action**
Mt Ommaney	Private – LFW Property			Contact landholder via phone / visitation						Manage exotic groundcovers, tobacco bush and devils fig. Canopy comprises *E. tereticornis*
Vileys Scrub Mt Ommaney	Brisbane City Council Reserve			Enter via Summit Street			Water Tank and Tap onsite. Picnic Tables and shelter on Site	Deer also present on site - Risk		Nil – good vegetation all strata
Westlake Drive	Brisbane City Council Reserve			Enter via Summit Street			Water Tank and Tap onsite. Picnic Tables and shelter on Site	Deer also present on site - Risk		Nil – good vegetation all strata
Coopers Plains										

Parkinson										
LOGAN CITY COUNCIL										
Camp	**Tenure / Land Manager – Contact Details**	**Existing planning and response documents**	**Appropriate Response Action**	**Access**	**Site Response Coordination**	**Principle Carer Groups - First Responders**	**Resources Available and Contact Details**	**Site Issues**	**Monitoring Activities**	**Alternate Remediation Action**
Regents Park	Logan City Council	Nil	Potential Spray Intervention during Event if FF's allow	Good Street Access	Leanne Robertson	BCRQ BQ ABC	BCRQ - Water Trailer BQ - Response Trailer	Little Shade and Space for triage set-up. No water on site.	Visual	Improve Vegetation mid and lower storey and gradually phase out weeds.
Cedar Grove	Logan City Council	Nil	Potential Spray Intervention during Event if FF's allow - Depends where bats are located on site.		Leanne Robertson	BCRQ BQ ABC	BCRQ - Water Trailer BQ - Response Trailer		Visual via Council easements	Nil
Cedar Vale	Logan City Council	Nil	Potential Spray Intervention during Event if FF's allow		Leanne Robertson		BCRQ - Water Trailer BQ - Response Trailer	Difficult to move around site		Nil
IPSWICH CITY COUNCIL										
Camp	**Tenure / Land Manager – Contact Details**	**Existing planning and response documents**	**Appropriate Response Action**	**Access**	**Site Response Coordination**	**Principle Carer Groups - First Responders**	**Resources Available and Contact Details**	**Site Issues**	**Monitoring Activities**	**Alternate Remediation Action**
Yamanto	Private Landholder		Potential Spray Intervention	Landholder Permission required. Difficult access.	Ipswich City Council Staff Coordination				Quarterly monitoring by Council & Carer Groups. >37-degree days – brief checks. Forecasted hot weather, monitored at least once a week / few days before to gauge camp composition, numbers, roost and retreat areas.	Investigate buffering activities immediately adjoining.
Bundamba	Potential Spray Intervention – somewhat	Access difficult	Ipswich City Council Staff Coordination				Quarterly monitoring by Council & Carer Groups.	Continue to undertake mid-storey tree planting.		

	used to people						>37-degree days – brief checks. Forecasted hot weather, monitored at least once a week / few days before to gauge camp composition, numbers, roost and retreat areas.			
Woodend	Private Landholder		Potential Spray Intervention		Ipswich City Council Staff Coordination		Water available from house		Quarterly monitoring by Council & Carer Groups. >37-degree days – brief checks. Forecasted hot weather, monitored at least once a week / few days before to gauge camp composition, numbers, roost and retreat areas.	Revegetation of mid-storey and canopy.
Camira			Potential Spray Intervention – however can be flighty	Good access	Ipswich City Council Staff Coordination				Quarterly monitoring by Council & Carer Groups. >37-degree days – brief checks. Forecasted hot weather, monitored at least once a week / few days before to gauge camp composition, numbers, roost and retreat areas.	Clear access to some additional areas – find reliable access to Sandy Creek?
Redbank			Potential Spray Intervention – however can be flighty	Good access	Ipswich City Council Staff Coordination		Good Relationship with neighbours		Quarterly monitoring by Council & Carer Groups. >37-degree days – brief checks. Forecasted hot weather,	

									monitored at least once a week / few days before to gauge camp composition, numbers, roost and retreat areas.	
Queens Park			Potential Spray Intervention – used to people	Easy access	Ipswich City Council Staff Coordination				Quarterly monitoring by Council & Carer Groups. >37-degree days – brief checks. Forecasted hot weather, monitored at least once a week / few days before to gauge camp composition, numbers, roost and retreat areas.	Nil
Waloon			Potential Spray Intervention – however can be very flighty	Easy access	Ipswich City Council Staff Coordination				Quarterly monitoring by Council & Carer Groups. >37-degree days – brief checks. Forecasted hot weather, monitored at least once a week / few days before to gauge camp composition, numbers, roost and retreat areas.	
Chuwar	Private Landholder			Unknown – new landholder	Ipswich City Council Staff Coordination				Quarterly monitoring by Council & Carer Groups. >37-degree days – brief checks. Forecasted hot weather, monitored at least once a week / few days before to gauge camp	

									composition, numbers, roost and retreat areas.	
SOMERSET REGIONAL COUNCIL										
Camp	**Tenure / Land Manager – Contact Details**	**Existing planning and response documents**	**Appropriate Response Action**	**Access**	**Site Response Coordination**	**Principle Carer Groups - First Responders**	**Resources Available and Contact Details**	**Site Issues**	**Monitoring Activities**	**Alternate Remediation Action**
Trish has list										
LOCKYER CITY COUNCIL										
Camp	**Tenure / Land Manager – Contact Details**	**Existing planning and response documents**	**Appropriate Response Action**	**Access**	**Site Response Coordination**	**Principle Carer Groups - First Responders**	**Resources Available and Contact Details**	**Site Issues**	**Monitoring Activities**	**Alternate Remediation Action**
Trish has list										
SCENIC RIM REGIONAL COUNCIL										
Camp	**Tenure / Land Manager – Contact Details**	**Existing planning and response documents**	**Appropriate Response Action**	**Access**	**Site Response Coordination**	**Principle Carer Groups - First Responders**	**Resources Available and Contact Details**	**Site Issues**	**Monitoring Activities**	**Alternate Remediation Action**
Trish has list										

14.2 HEAT STRESS DATA RECORDING

If number of personnel available allow, data recording of triage measures taken, and responses will give invaluable data to assist in future responses. Fill in as much as possible.
If you have been involved in a heat event, data collection greatly assists in the refining of protocols and monitoring population effects. Add as much information as you feel you can. If you feel you cannot confidently separate the species by age and/or by sex then the total number, or the number for each species, still provides very important information.

COLONY:	
Date:	
Time:	
Recorder (Name and Ph Number)	
Temperature and relative humidity	
Location (include map on separate sheet if possible):	
Characteristics of site: (including vegetation structure (complete / incomplete), recent disturbances access to water and any other relevant information)	
Details of heat stress event: (including any recorded temperatures, relative humidity and behavioural observations) Please note if you have related video footage / photographs	
Details of methods or management approaches used during the heat stress event. (i.e. monitoring and collecting only; active spraying etc) Also note any responses – positive or negative This will help to modify future responses. NB (note if Video or photographic footage available)	
Observer name:	

Phone:	
Email:	

ALIVE			
Estimated total number of flying-foxes present:			
Estimated number of flying-foxes present by species:	*Grey-headed*	*Black*	*Little Red*
DEAD			
Estimated total number of flying-foxes that died/ found dead:			
Estimated number of flying-foxes that died /found dead / were euthanised by species, age and sex:	*Grey-headed*	*Black*	*Little Red*
Adult females			
Adult males			
Juveniles			
Unknown			
Comments:			

FLYING FOXES TAKEN INTO TRIAGE			
Estimated total number of flying-foxes triaged:			
Estimated number of flying-foxes by species:	*Grey-headed*	*Black*	*Little Red*

Number taken into care:			

FLYING FOXES REHABILITATED POST CARE:						
Estimated total number of flying-foxes successfully released:	*Grey-headed*		*Black*		*Little Red*	
	Juvenile	*Adult (male or female)*	*Juvenile*	*Adult (male or female)*	*Juvenile*	*Adult (male or female)*

POST-MORTEM MEASUREMENTS				
Date:				
Time:				
Location:				
Observer name:				
Phone:				
Email:				
Species (B-GH-LR)[1]	*Sex (M-F)*	*Forearm (mm)*	*Body mass (grams)*	*Comments*

If you are experienced and qualified in taking morphometric measurements, and have taken the proper precautions, please provide details of the species, sex, forearm length and weight of

[1] B: Black Flying-fox, GH: Grey-headed Flying-fox, LR: Little Red Flying-fox

individuals that died. This should be done soon after death to account for post-mortem changes in weight. If too many individuals have died to measure them all, please provide details from a representative sample.

Please send a copy of completed data sheets to:	• Dr. Tania Bishop, email: taniab@wildlifewarriors.org.au
	• Dr Justin A. Welbergen, email: j.welbergen@uws.edu.au Hawkesbury Institute for the Environment, UWS Hawkesbury Campus, Locked Bag 1797, Penrith, NSW 2751

14.3 INDIVIDUAL OUTCOME FORMS

Bat no or ID (details)	
Presentation: initial temperature, demeanour, hydration, other injuries If euthanased – go to next bat	
Details of triage measures – SC fluids etc Also note any responses – positive or negative This will help to modify future responses. NB (note if Video or photographic footage available)	
Outcome: I.e. – vet, euthanised, into care?	
Bat no or ID (details)	
Presentation: initial temperature, demeanour, hydration, other injuries *If euthanased – go to next bat*	
Details of triage measures *– SC fluids etc* *Also note any responses – positive or negative* *This will help to modify future responses.* *NB (note if Video or photographic footage available)*	
Outcome: *I.e. – vet, euthanised, into care?*	

14.4 VOLUNTEER SIGN ON SHEET

SITE LOCATION:
DATE:

Name	Vacc Status	Role	Contact phone	Email	Next of kin / emergency	Time in	Time out	PPE	First aid Cert? Y/N

14.5 INCIDENT REPORT

Fill out in the event of any injury incident during the event

Date / Time	Name	Contact	Vacc status	Nature of incident	Notes	Follow up

14.6 COMMUNICATION EXAMPLE

Wildlife Heat Warning

As you may be aware, local temperatures will be over 40º this week. In such heat, our native wildlife suffers terribly.

Living near a flying fox colony, you may find bats seeking shade in your garden trees in the heat of the day. They pose no risk, but should not be touched or disturbed, and will return to their camp when it cools down.

If you find a bat injured or on the ground, please **do not touch the bat**, but call one of these numbers and a vaccinated wildlife rescuer will come to help you.

In the meantime, keep people and pets away, and don't try to offer any food or water.

At this time of year, any dead or injured animals may also have a baby on board.

If you have any concerns or questions you may also call these numbers for information.

[Rescue group]
[phone number]
Australia Zoo Rescue Unit – 1300 369 652
RSPCA 1300 264 625
(1300 ANIMAL)

14.6 WORKSHOP QUESTIONNAIRE FOR INITIAL DATA COLLECTION

SEQ HEAT EVENT PLANNING FRAMEWORK WORKSHOP

IDENTIFICATION OF HEAT STRESS EVENT (HSE) SITES

2. How can we identify when a camp is at high risk for a HSE?

Consider the heat stress variables (and any others) and discuss their effects on prioritisation of camps in a HSE – consider these variables for camps that you are familiar with

Weather/Climate	Camp attributes	Demographics
Temperature <40°C No. of consecutive days	Size of camp and history of prior heat events	Time of year – mating; pregnant lactating female, pregnant females
Humidity	Camp composition – understory, mid-storey and canopy – open / closed structure	No., age and developmental stage of juveniles
Wind direction	Proximity to water	Species composition
Other stressors for camp e.g. camp management, food shortages	Topography / aspect / altitude	
	Location	

SITE MONITORING & INFORMATION DISSEMINATION

3. What resources are available for camp monitoring leading up to and during heat events?

- Should we be considering monitoring camps at regular intervals throughout the year to gain an understanding of camp behaviours?
- How regularly should we monitor camps directly during heat event season?
- Do we have adequate members of our teams educated in reading camp and flying fox behaviours?
- What other aides are available to help monitor and how often should we use all of these methods? E.g. – Bureau of Meteorology (BOM); Flying-fox Heat Stress Forecaster, Weather zone, data loggers in camps?

4. What are the behavioural changes of a flying-fox suffering from heat stress / heat stroke?

- When and how should we intervene physiologically?
- Who is authorised to retrieve and treat flying-foxes?

Behaviour	Description	Response
Wing fanning		
Shade seeking		
Clustering / clumping		
Licking		
Salivating		
Panting		
Falling from tress		
Bats on ground / disorientated		
Seizing / non-responsive		
Deceased		

5. Communication

- How can we best disseminate information AS A SEQ HEAT EVENT RESPONSE GROUP?
- How do we best keep communication lines open, supportive and constructive leading up to, during and after heat events?
- What are important components of a communication plan for media and surrounding community?

- Social media - ? – alert when heat stress forecasters and BOM are indicating heat events are likely
- Monitor local camps directly and communicate behaviours
- How do we effectively trigger to entire groups that preparation needs to start?

RESPONSE ACTIVITIES

6. The human aspect of responding to heat events - WH&S (Physical & Emotional)

- What WH&S Procedures Need to be in place?
- Council WH&S requirements for operations on Council Property?
- HSE's are stressful and emotive. The emotional toll on all parties responding to a heat event is grossly underestimated.
- How do we support the people involved in these events?

7. HSE Response Logistics

- Each camp is unique, however the HSE operative should be the same. What on-site features need to be identified at a HSE site? What equipment needs to be on standby?

Feature	Details
Access	Tenure, locked gates, parking, footpaths or tracks, no-go zones, maps
Health and safety	Headquarters / operative tent, inductions, sign in-out sheets, first aid, drinking water, wash station, PPE. Any amenities?
Available resources	Water, power
Rescue and care	Triage area, rescue / transport access and process
Drivers	Animals to wildlife hospitals / carers
Existing planning and response documentation	

8. What resources do we need to have ready and available to effectively respond to a heat event AND How do we enact their availability?

Resource	Enaction
Shade	
Water	
PPE i.e.	
Protective clothing	
Ice vets	
Triage equipment i.e.	
Battery operated fans	
Body disposal	

9. Roles

- Successful HSE responses require many and varied roles requiring differing skill and fitness levels.
- What roles do we need to ensure we have covered at each HSE site?

Roles	Responsibility	Who? (e.g. Council, carers, vets, community, business)
Safety officer		
Communication		
Colony monitors		
Induction / scribe / data recorder		
Coordination		
Rescue		
Spraying		
Triage and post triage monitoring		
Body removal		
Euthanasia / drug licence		
Drivers		
Carers on standby		
Set up and pack up		
Food, water provision		
Human first aid		

HSE REPORTING

10. Data has the capacity to better frame our responses to HSE's as well as to provide valuable information on the effect of HSE's on the flying-fox population as a whole.

- How can we improve out data reporting during HSE's?
- Who should we be reporting this data to?
- What data is important and why?

COMMUNITY ENGAGEMENT & COMMUNICATION

11. Community Engagement

- How can we more effectively communicate and engage with the local community in the lead up to heat events in order to allay fears but also ensure that they don't enter or handle heat affected bats?
- How do we best respond to media and members of the surrounding community?

SUBREGIONAL RESPONSES

12. HSE Prone Camps & Appropriate Response Action

- Which camps have historically had HSE and which NEW camps may be of concern?
- Based on the individual characteristics of each camp – i.e. demeanour of bats; accessibility; local resources; camp structure and vegetation, what are appropriate intervention methods for managing heat stress?
  i.e.; water truck/ute sprayers; shade provision; backpack spraying; no intervention until late stages, as bats are too unaccustomed to human presence?

Camp	Appropriate Response Action

13. Monitoring

- Monitoring options: include remote camera options also

Camp	Monitoring Options	Who?

14. Communication

- Who, how and when?

Who	How	When
Landholder		
Resource Providers (E.g. water trucks etc)		
Carer Groups & Support People		
Wildlife Hospitals		
Reporting – HSE Website, Local Councils etc • .. • ..		

15. Site Logistics

- **Camp:_____**

Feature	Details	Notes
Access	Tenure, locked gates, parking, footpaths or tracks, no-go zones, maps	
Health and safety	Headquarters / operative tent, inductions, sign in-out sheets, first aid	
Available resources	Water, power	
Rescue and care	Triage area, rescue / transport access	
Drivers	Animals to wildlife hospitals / carers	
Existing planning and response documents		

Site Logistics

- **Camp:_____**

Feature	Details	Notes
Access	Tenure, locked gates, parking, footpaths or tracks, no-go zones, maps	
Health and safety	Headquarters / operative tent, inductions, sign in-out sheets, first aid	
Available resources	Water, power	
Rescue and care	Triage area, rescue / transport access	
Drivers	Animals to wildlife hospitals / carers	

Existing planning and response documents		

Site Logistics

- **Camp:_____**

Feature	Details	Notes
Access	Tenure, locked gates, parking, footpaths or tracks, no-go zones, maps	
Health and safety	Headquarters / operative tent, inductions, sign in-out sheets, first aid	
Available resources	Water, power	
Rescue and care	Triage area, rescue / transport access	
Drivers	Animals to wildlife hospitals / carers	
Existing planning and response documents		

16. Response Resources and Availability (equipment and human resources)

- **Camp:_____**

Resource	Enaction
Shade	
Water	
PPE -	
Protective clothing -	
Ice vets	
Triage equipment -	
Battery operated fans	
Water	
Body disposal	

- **Camp:_____**

Resource	Enaction
Shade	
Water	
PPE -	
Protective clothing -	
Ice vets	
Triage equipment -	
Battery operated fans	

Water	
Body disposal	

- **Camp:_____**

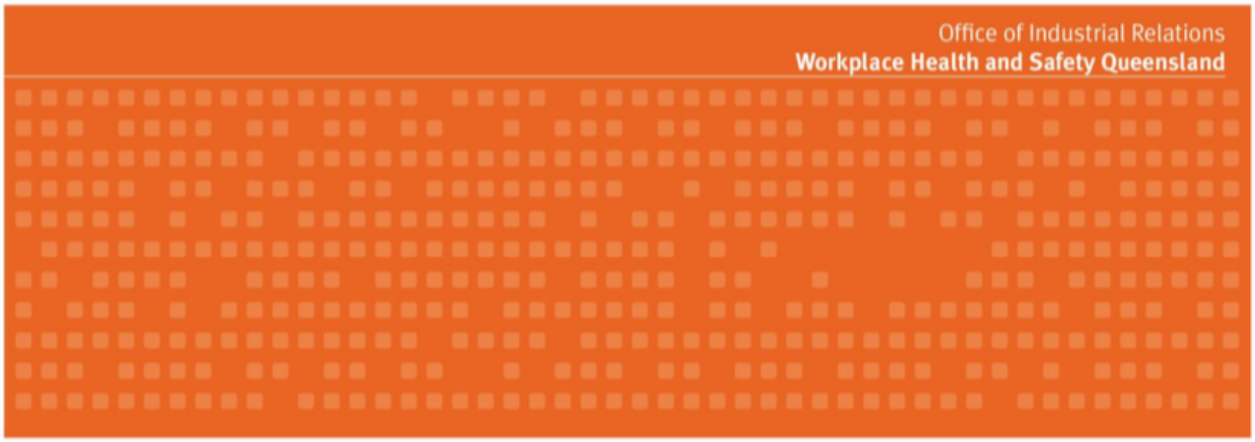
Resource	**Enaction**
Shade	
Water	
PPE -	
Protective clothing -	
Ice vets	
Triage equipment -	
Battery operated fans	
Water	
Body disposal	

17. Alternate remediation actions for Camps

- Camp habitat structure improvements, installation of sprinklers etc

Camp	**Alternate Remediation Action**

14.6 ABLV AND FLYING-FOX HANDLING



Australian bat lyssavirus and handling bats

Australian bat lyssavirus (ABLV) is a virus that can be transmitted from bats to humans. It causes a rabies-like illness that is invariably fatal.

All bats in Australia have the potential to be infected with ABLV. The behaviour or appearance of a bat is not an accurate guide as to whether it is infected with the virus.

Transmission of infection

ABLV is found in the saliva and neural tissues (brain and spinal cord) of infected bats. Human infection occurs when a person is bitten or scratched by an infected bat. Infection may also occur if the saliva or neural tissues of an infected bat come into contact with a person's broken skin or mucous membranes, that is, the eyes, nose and mouth.

Contact with bat faeces, urine and blood is not considered to be a risk for ABLV exposure. However contact with bat fluids should be avoided.

ABLV is unlikely to survive on the external surface of a dead bat for more than a few hours. However care should be taken when handling dead bats by using a shovel or suitable gloves to minimise the risk of accidental scratches from sharp claws. ABLV may persist in the neural tissues of a dead bat, which should be handled with caution until safely disposed of.

At-risk workers

Workers who are at risk of exposure to ABLV include veterinarians and their staff, zoo workers, wildlife officers, bat rescue and rehabilitation carers, fauna surveyors, bat scientists, electrical workers who remove bats from powerlines, laboratory personnel who handle bat tissues or live lyssaviruses, and any other person who has occupational contact with bats.

A person will not be exposed to ABLV risks merely by working near a bat colony.

Managing ABLV risks

The *Work Health and Safety Act 2011* places a duty on persons conducting a business or undertaking (PCBU) to ensure, so far as is reasonably practicable, the health and safety of themselves and their workers while at work, and to ensure that the health and safety of other people is not put at risk from work carried out as part of the business or undertaking.

The PCBU also has a duty to provide and maintain, so far as is reasonably practicable, a safe system of work to manage ABLV risks. For example:

- ensure that only people who have current rabies vaccination have contact with bats
- provide any information, training, instruction or supervision that is necessary to protect people from ABLV risks
- provide suitable personal protective equipment (PPE) and ensure that PPE is worn by at-risk workers
- develop a protocol for managing potential ABLV exposures, and provide appropriate first aid equipment and training.

Rabies vaccination

Workers at occupational risk of exposure to ABLV require a course of three doses of rabies vaccine – called 'pre-exposure prophylaxis'.

Workers who work with live lyssavirus in laboratories should have a blood test every six months to measure their rabies antibody titre (a measure of protection against ABLV). If the titre (concentration) is reported as inadequate (<0.5 IU/mL), they should have a booster dose of rabies vaccine.

Other workers who have ongoing contact with bats should have rabies antibody titres measured every two years. If the titre is reported as inadequate (<0.5 IU/mL) they should receive a booster dose of rabies vaccine. Alternatively, a booster dose can be offered every two years without determining the antibody titre.

The PCBU should ensure that at-risk workers have current rabies vaccination and that vaccination records are maintained.

PPE

PPE should be provided and worn to minimise the risk of exposure to ABLV. PPE should be selected based upon the assessed level of risk, the task and the bat species. PPE may include:

- puncture resistant gloves that meet relevant Australian Standards (e.g. AS 2161.3 *Occupational protective gloves. Protection against mechanical risks*)
- long sleeved clothing and long pants
- puncture resistant gauntlets to protect the forearms
- safety eyewear or a face shield to protect the face and mucous membranes from bat bites and scratches and from contact with bat saliva and neural tissues.

The PCBU has a duty to provide workers with information, training and instruction on the proper use and wearing of PPE, and to ensure that it is used or worn by workers, so far as is reasonably practicable.

Hand hygiene should be performed after contact with bats and removing PPE, and cuts should be covered with a water-resistant dressing.

Post-exposure protocols

If a person sustains a bat bite or scratch, or if bat saliva or neural tissue comes into contact with a person's broken skin, the affected area should be washed thoroughly with soap and water for at least five minutes. A virucidal antiseptic such as povidone-iodine, iodine tincture, aqueous iodine solution or alcohol (ethanol) should be applied to the area after washing.

If the exposure involves the person's mucous membranes (eyes, nose or mouth), the area should be flushed thoroughly with water.

Immediate medical advice should be sought as booster doses of rabies vaccine are likely to be necessary – called 'post exposure prophylaxis'. This is important regardless of previous rabies vaccination, the severity of the wound, the bat species involved or whether or not the bat appears sick.

People who have received pre-exposure prophylaxis require a further two doses of rabies vaccine following a potential exposure.

People who have not received pre-exposure prophylaxis require rabies immunoglobulin and a course of four doses of rabies vaccine following a potential exposure. Any person who has an immunocompromising illness or who is on immunosuppressant medication will require a further (fifth) dose of vaccine and follow up blood tests to confirm their immunity.

The bat can be collected for laboratory examination to test for ABLV infection if this can be done without placing other people at risk of exposure. Only a vaccinated person who is trained in bat handling and has suitable PPE should collect the bat. Contact the local Public Health Unit to arrange for bat collection.

People at occupational risk of exposure to ABLV should not forego pre-exposure prophylaxis on the basis that rabies immunoglobulin and a course of rabies vaccination can be given following a potential exposure. This is because inapparent exposure may occur when there is regular contact with bats, with potentially fatal consequences.

Additional industry-specific control measures

Additional industry-specific control measures may be needed to eliminate or minimise the risk of exposure to ABLV. For example:

- **Veterinarians**: Follow the guidance in Biosecurity Queensland's *Australian bat lyssavirus guidelines for veterinarians*.

- **Fruit growers:** Use small aperture safe netting to minimise wildlife entanglements.
- **Tourism operators:** Inform wildlife tourist groups about ABLV risks and take steps to avoid placing tourists in close contact with bats, such as positioning groups away from the direct flight path of bats emerging from caves.
- **Bat exhibitors:** Do not allow members of the public to touch bats, and keep bats within suitable enclosures to prevent public access.
- **Wildlife rescue and care:** Use a thick towel to cover bats during rescue, isolate bats with neurological signs of illness from other bats in care and seek veterinary advice, use calming methods for pups such as teats, and minimise non-essential contact with bats.
- **Fauna surveyors:** Do not place unprotected hands into tree hollows, crevices or other areas where bats may be roosting, and consider using an inspection camera to look for wildlife inside areas that can't be readily viewed.
- **Electrical workers:** Use a no-touch technique to remove bats from powerlines, and arrange for a wildlife carer to receive rescued live bats and orphaned pups.

Sick, injured and orphaned bats

Anyone who finds a sick, injured or orphaned bat should not touch it. Contact a local wildlife care organisation or the RSPCA (1300 ANIMAL) to find a licensed and vaccinated wildlife rescuer who is trained to handle and care for wildlife.

Bats are a protected species and it is unlawful under the *Nature Conservation Act 1992* to interfere with a bat colony.

Further information

For more information on work health and safety, visit www.worksafe.qld.gov.au or contact WHS Infoline on 1300 362 128.

For more information on ABLV or animal health, visit Biosecurity Queensland's website at www.daf.qld.gov.au or phone 13 25 23.

For more information on ABLV and human health, visit Queensland Health at www.health.qld.gov.au or phone 13HEALTH (13 43 25 84).

For more information about bats and environmental issues, including safe netting and damage mitigation permits, visit the Department of Environment and Heritage Protection at http://www.ehp.qld.gov.au/ or phone 13QGOV (13 74 68).

14.7 LIVING WITH FLYING-FOXES

Living near flying-foxes... health and conservation issues answered

If you live near a flying-fox roost, you may be concerned about risks to your health and curious to know more about them.

Flying-foxes are not a health risk to you unless you are bitten or scratched, so please do not handle them.

Flying-foxes are nocturnal mammals that fly up to 50km in a night to feed on fruit, nectar and blossom. In the process, they pollinate flowers and disperse seeds of important native trees—vital for the health and upkeep of many forest species.

Returning at dawn from feeding areas, flying-foxes hang out together in camps or roosts, some of which have been occupied for centuries.

Clearing of native vegetation has caused a decrease in flying-fox foraging and roosting habitat. That's why some flying-foxes are moving into roost sites near urban areas where food, native and exotic, is generally available all year round.

Flying-foxes often have a strong connection to roost sites and can be extremely resistant to relocation efforts.

Why are flying-foxes important?

Flying-foxes make a significant contribution to maintaining healthy ecosystems as essential pollinators and seed dispersers for native forests. In turn, these forests provide valuable timber, act as carbon sinks, stabilise our river systems and water catchments, and promote recreation and tourism opportunities returning millions of dollars to our economy each year.

Pollen sticks to their furry bodies and as they crawl from flower to flower, and fly from tree to tree, they pollinate the flowers and aid in the production of honey.

Eucalypts rely heavily on these pollinators, producing most of their nectar and pollen at night to coincide with the time when bats are active.

Because flying-foxes are highly mobile, seeds can be moved locally and over great distances. When seeds are able to germinate away from their parent plant, they can have a greater chance of surviving and growing into a mature plant.

Seed dispersal also expands the gene pool within forests. Mature trees then share their genes with neighbouring trees of the same species and this transfer strengthens forests against environmental changes.

Flying-foxes are an important part of the diet of some native predators including the powerful owl *Ninox strenua*, the largest native owl of Australia. Research shows flying-foxes comprised almost half of the total weight of food consumed by a pair of powerful owls over two consecutive years of study.

Community concerns

Flying-foxes are protected by law.

If flying-foxes are impacting on the health and wellbeing of the public or causing damage in a community, individuals or councils may apply to the department for a damage mitigation permit (DMP) to safely manage a roost.

A DMP may be granted to disperse flying-foxes by non-lethal means in an effort to move them to a new location. This includes use of a bright light or noise based deterrents for a sustained period of time. The government is currently considering the reintroduction of lethal DMPs for fruit crop protection involving shooting where other mitigation efforts have failed. There will be no large scale culls—only a limited number of permits only issued to farmers as an absolute last resort.

When assessing a DMP application, a range of matters are considered including human health and wellbeing and the likely effects on the survival of the animals in the wild. The dispersal of a flying-fox roost will only be considered as a last option and only if alternative roosting sites are available.

The current occurrence of Hendra virus is also an important consideration in flying-fox management and the department works closely with Biosecurity Queensland and Queensland Health in assessing any applications to disperse flying-foxes.

Queensland Government

Illegally disturbing flying-foxes in a roost; driving them from a roost; interfering with their roost; or harming or killing flying-foxes without a damage mitigation permit can attract penalties of up to a $100,000 fine or up to one year's imprisonment.

Are all bats flying-foxes?

No. Over 60 species of bat occur throughout Australia and of these only four are commonly called flying-foxes due to their fox-like faces.

Flying-foxes are amongst the world's largest bats weighing up to one kilogram with a wing span over one metre. They are highly adapted to night time activity, with large eyes particularly suited for recognising colour at night and a strong sense of smell—essential senses for locating their food.

Four species of flying-fox are native to mainland Australia and occur mostly in northern and eastern temperate and sub-tropical coastal areas: the little red flying-fox, the black flying-fox, the greyheaded flying-fox and the spectacled flying-fox.

What do flying-foxes eat?

Flying-foxes feed on blossom and fruit in tall trees—mostly the nectar and pollen from eucalypts, melaleucas and banksias. They also eat leaves. Their diet includes over 100 species of native trees and vines.

This native diet is now supplemented by fruit of introduced plants such as garden and orchard fruit trees, street tree plantings, introduced palms and some noxious weeds such as privet.

Flying-foxes search for food over extensive areas when leaving their roost at dusk. Return trips of approximately 50km are usual. The greatest distance travelled in one night is 400km.

Flying-foxes digest most of their food within 15–20 minutes, so most ingested seed is deposited away from their roosts.

Flying-fox camps or roosts

Flying-foxes are social animals usually living in large groups called roosts—as small as a dozen animals but usually numbering in the tens or hundreds of thousands. A temporary roost of little red flying-foxes can include as many as one million individuals.

The size of a roost is determined by how much fruit and blossom is available within a 20km radius of a roost.

Roosts are at their largest during the flying-fox breeding season from Spring through to Summer.

Changes in the population of a roost reflect where food is available. Production of fruit and blossom is thought to be related to conditions in previous seasons. Extended dry or wet periods, e.g. drought, may have a significant impact on local food availability.

Therefore at times roosts may contain tens, hundreds or thousands of flying-foxes, or none. Some camp sites are occupied permanently, others seasonally and others irregularly.

Roosts are often semi-permanent with flying -foxes leaving seasonally or when food is no longer available nearby, or when an area is overtaken by the impact of encroaching development. Some roosts have histories of use exceeding 100 years.

Flying-foxes are intelligent with good memories that enable them to remember the locations of roosts and associated feeding sites.

Roosts provide a rest site and meeting place for social interaction within nightly commuting distance of food. For several weeks in late spring and summer, they also provide refuge during the day for mother flying-foxes and their young.

During the night, roosts are a safe refuge for flightless young, while adults depart to feed.

Most trees within a roost are occupied by a mix of adults—a single male, who scent-marks and defends a territory shared by one or more females, and their dependent young. Animals often return to the same branch of a tree over many weeks or months.

Physical characteristics of roosts

Flying-foxes in coastal lowlands of south east Queensland and New South Wales prefer to roost in vegetation with the following general characteristics:

- a closed canopy at least 5m high
- upper, mid and understorey layers
- dense vegetation within 500m of a river or creek
- within 50km of the coastline or at an elevation less than 65m above sea level
- level topography
- at least one hectare in size
- large enough to accommodate and sustain large numbers of flying-foxes
- generally within less than 20km of food.

Where flying-foxes are found

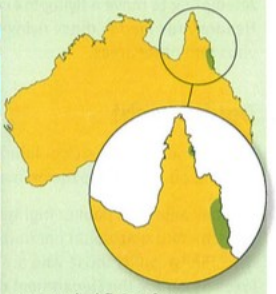
Flying-foxes are crucial to keeping native forests healthy. They play an important role in dispersing seeds and pollinating flowering plants.

Four species of flying-fox are native to Australia and occur mostly in northern and eastern temperate areas, and sub-tropical coastal lowlands: little red flying-fox, black flying-fox, greyheaded flying-fox, and spectacled flying-fox (Images: Bruce Thomson).

black flying-fox

little red flying-fox

grey-headed flying-fox



spectacled flying-fox

Why so noisy?

Like humans, flying-foxes are very social animals. When at a roost or feeding, they 'squabble' loudly. This mixture of screeches and cackles is a language used to establish personal roost sites or feeding territories, ward off rivals, communicate with offspring, and warn others of possible threats.

Flying-foxes tend to be most vocal during mating season, spring and summer.

The grey-headed flying-fox is known to have more than 30 specific calls. By listening and watching, it may be possible to link some of the flying-fox's behaviour to the calls it makes.

Some calls are special to mothers and young. Mothers carry very young babies out with them while feeding. But the load becomes too much after about six weeks and they leave their protesting youngsters behind. On return to a roost after feeding, mothers can identify their young by voice recognition and individual scent.

When flying-foxes are stressed or frightened, they make even more noise. Colonies tend to be noisiest when disturbed by people and least noisy when left alone.

Safety and health issues

From a public health perspective there is in almost all circumstances no reason for a community to be alarmed if a colony moves in nearby.